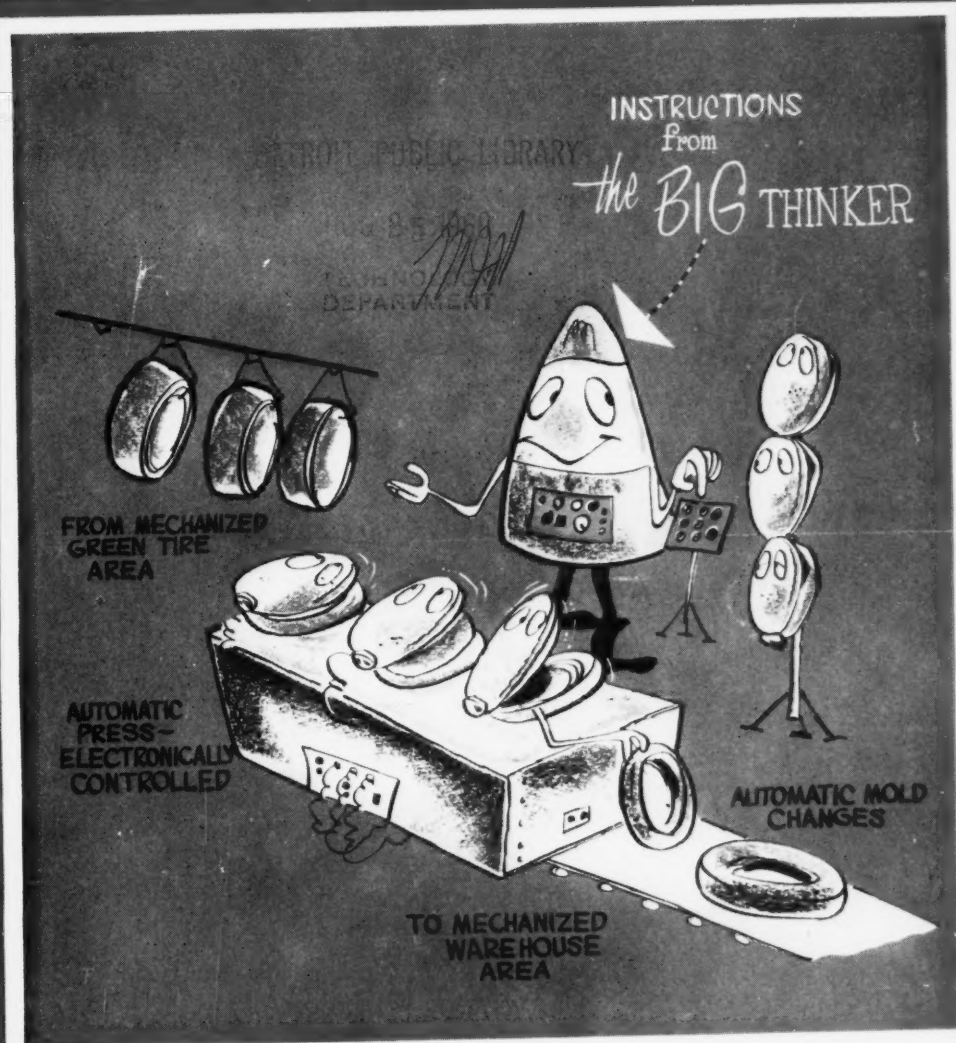


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AUGUST 1960



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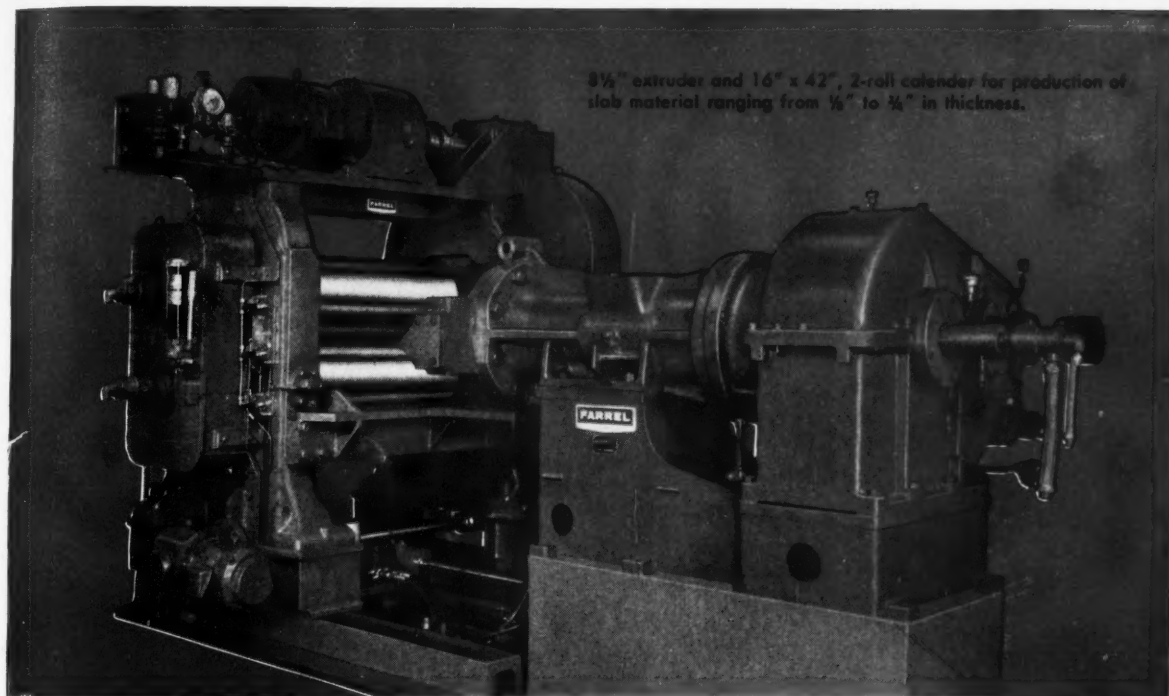


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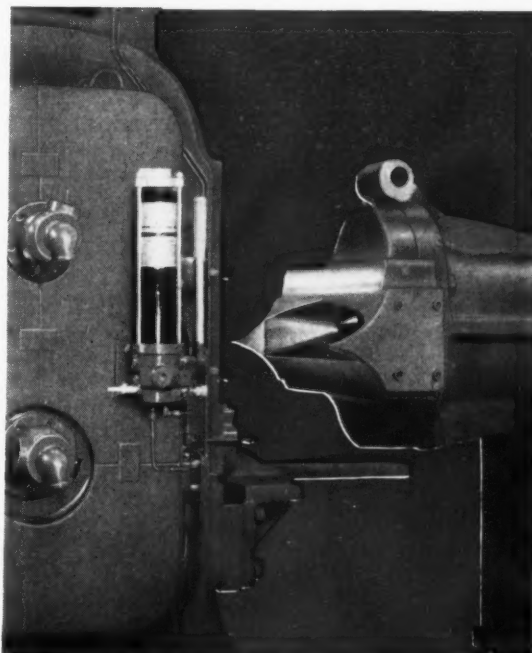
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Close-up of the extruder head which feeds directly into the bite of the rolls.



August, 1960

FB-1200

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RUBBER WORLD

VOLUME 142

NUMBER 5

AUGUST, 1960

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Cover photo: Courtesy of Hochschwender & Associates

SERVING THE RUBBER INDUSTRY SINCE 1889

A BILL BROTHERS PUBLICATION

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WORLD

news of the rubber world

Synthetic rubber producers have agreed on plans to form a trade association. Bancroft Henderson, who will become managing director, announced that 15 United States and overseas SBR producers will meet in September to organize the International Institute of Synthetic Rubber Producers. This needed organization is saluted by RUBBER WORLD.

Woe is us! Front-page pictures in the Nation's press showing President Eisenhower with a FLAT TIRE.

The two rubber conferences which take place in Europe during October (West Berlin, October 4-7, and London, October 11-13) should have good attendance by U.S. technologists. As we went to press, it was announced that sufficient reservations to assure the Rubber Division sponsored charter flight are expected by M. E. Lerner, Rubber Age, chairman of the charter flight committee.

The first annual RUBBER WORLD award for the best work in the University of Southern California's course in Rubber Technology Laboratory I sponsored by the Tlargo Foundation was won by Peter Katsenis. Peter specialized in rubber technology while working for his M.S. in Ch.E. and is now employed by B. F. Goodrich Chemical at Avon Lake, O.

A new entity has been formed to join the race to produce the new stereo polymers. American Rubber & Chemical Co., a joint venture of Stauffer Chemical and American Synthetic Rubber Co., will build a dual-purpose polybutadiene-polyisoprene plant adjacent to ASRC plant in Louisville and will produce primarily cis-polybutadiene under license from Phillips. Phillips also announced plans to increase capacity of its plant for producing Cis-4 which will soon be on stream.

FTC and Congress are still considering stricter rules covering rubber company-oil company marketing of TBA items through the oil company retail outlets.

obituaries

James M. Scott

James M. Scott, 50, general plant manager and treasurer of Scott Testers, Inc., Providence, R. I., and president of its affiliate, Scott Testers Southern, Spartanburg, S. C., died June 19 of a heart attack.

A son of David C. Scott, founder of Scott Testers, and brother of the current president, David C. Scott, Jr., the deceased spent his entire business career with this firm, which manufactures physical testing equipment for rubber, textiles, plastics, and other industries.

Mr. Scott was also a director and assistant treasurer at American Textile Co., Pawtucket, R. I. He was a past president of the Rhode Island Rubber Club and was a former member of the executive board of the industrial instrument division of Scientific Apparatus Makers of America. In addition, he was a past president of the Rhode Island Branch, National Metal Trades Association, and had also worked with it in an advisory capacity. He was, moreover, a member of the Chemists Club, New York, and the Providence Engineering Society. Mr. Scott was also active in local civic affairs.

The deceased attended Moses Brown School, Tabor Academy, Bryant College, and Massachusetts Institute of Technology.

Ralph L. Wilson

Ralph L. Wilson, senior vice president, treasurer, and a director of Bill Brothers Publications died on July 17 in the Stamford, Conn. Hospital.

Mr. Wilson was graduated from New York University in 1931 and became a Certified Public Accountant in 1937. He was employed by the accounting firm of Ernst & Ernst. In 1940 he became comptroller of Bill Brothers Publications. He was named treasurer in 1955 and senior vice president in 1957.

In addition to RUBBER WORLD, other Bill Brothers interests with which he was associated were *Fast Food*, *Floor Covering Profits*, *Modern Tire Dealer*, *Plastics Technology*, *Premium Practice*, *Sales Management*, *Sales Meetings*, and *Market Statistics, Inc.*, as well as Book and Service Divisions of the company.

The deceased was born February 7, 1911, in New York, N. Y.

He is survived by his wife, three sons, a daughter, his mother, his father, publisher of RUBBER WORLD, and two sisters.



James M. Scott



Ralph L. Wilson

Funeral services were held July 19 at the Noroton Presbyterian Church, Darien, Conn. Interment at Yonkers, N. Y., on July 21 was private.

Clifford A. Jones

Clifford A. Jones, former managing director of H. A. Astlett & Co. (Canada) Ltd., Toronto, Ont., Canada, died at his home in Hayward, Calif., early in June. He was in his late 70's.

His career began in the United States

with Goodyear Tire & Rubber Co., Akron, O. Then he went to Seiberling Rubber Co., Akron. In 1927, Mr. Jones was transferred to Toronto as general manager of Seiberling Rubber Co. of Canada, Ltd. From 1933 to 1936 he was assistant general manager of Viceroy Mfg. Co., Toronto, and later joined Gem Rubber Co., Toronto (now Dayton Rubber, Ltd.). During World War II he was with Fairmont Co., Canada, handling allocations of natural rubber.

Mr. Jones became managing director of H. A. Astlett & Co. (Canada), Ltd., in 1945 when the company was established in Canada. He retired in 1956 to live in California. His career in the rubber industry lasted about 50 years.

Francis H. Peaty

Francis H. Peaty, retired partner, H. A. Astlett & Co., Inc., New York, N. Y., died June 11 in a Montclair, N. J., hospital after a long illness.

Mr. Peaty joined the company in 1914 and retired in 1942. Prior to that time he had been a partner in the firm of Raw Products Co., New York.

Born 88 years ago in London, England, the deceased came to this country 72 years ago.

He was a life member of St. George's Society, New York; a member of Caldwell Lodge 59, F & AM; and a member of the English Speaking Union and the Downtown Athletic Club.

Services were held in the Chapel of St. Luke's Episcopal Church, Montclair.

He is survived by a daughter, a son, two grandchildren, and a great-grandson.

Malcolm R. Buffington

Malcolm R. Buffington, consultant, died June 5 at East Orange Hospital, East Orange, N. J., following an extended illness.

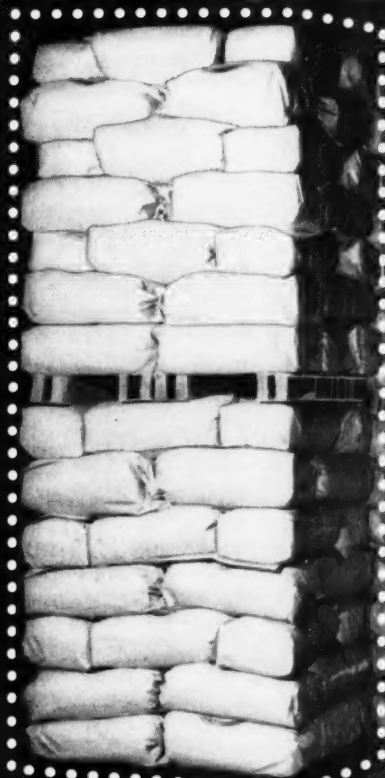
Mr. Buffington, a chemical engineer, had been employed by Lea Fabrics in Newark, N. J. and was a vice president at the time of his retirement.

The deceased had been very active in the New York Rubber Group and served as co-chairman of the summer outing for several years and as chairman of the Group in 1951.

He is survived by his wife, a son, and three daughters.

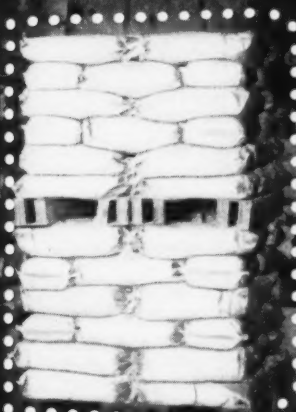
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news from abroad

German Rubber Society October Berlin Meeting To Feature Papers on Rubber and Fiber Technology

Deutsche Kautschuk-Gesellschaft, the German Rubber Society, has announced the program for its General Meeting and Congress to be held in the Kongresshalle in West Berlin, Germany, October 4 to 8, 1960. More than 60 papers are expected to attract an attendance of 800 to 1,000 rubber scientists and technologists from 30 countries. There will be sightseeing tours and a program for the ladies, and the social events will be highlighted by a special evening program at the Palais am Funkturm.

The theme of the Congress is centered on synthetic rubber and synthetic fibers and is underscored by two lectures scheduled for the plenary session on the opening day of the Congress. Paul Baumann, chairman of the board of directors of Chemische Werke Huls AG, will speak on the development of synthetic rubber during the past 30 years. Alfred Ebert, a member of the board of directors of Vereinigte Glanzstoff-Fabriken AG, will discuss progress made in the use of synthetic fibers in the rubber industry and their outstanding importance for the future.

On October 4 the meeting will open with an international press conference; a general meeting of the German Rubber Society will be held in the afternoon, and there will be a reception for guests of honor by the Senate of the City of West Berlin in the evening. On October 5 the inaugural session will be opened by G. Fromandi, president of the Society, and there will be an address by the Chief Burgomaster of West Berlin.

Further information on this German Rubber Congress and arrangements for registration may be obtained by addressing: DKG-Geschäftsstelle, Mainzer Landstrasse 66, Frankfurt/Main, West Germany.

The program for the technical papers which are to be given at the Congress is as follows:

Wednesday, October 5 Elastomers—I

O. Giese, Fulda, Presiding

Diene Rubber—A Linear Polybutadiene. G. Alliger, B. L. Johnson, and L. E. Forman, Akron, O., U.S.A.

Development and Importance of Polybutadienes. F. Engel, Marl-Huls.

Ethylene-Vinyl Acetate Copolymers

and Their Cross-Linking. H. Bartl and J. Peter, Leverkusen.

Rubber-Elastic Properties of Ethylene-Propylene Polymer. G. Natta, G. Crespi, and M. Bruzzzone, Milan, Italy.

First Use of New Highly Elastic Ethylene-Propylene Polymer. C. Canevari and A. Morando, Milan.

Butyl and Its Uses. G. Klotsch, M. Langheck, W. C. Smith, and R. L. Zapp, Linden, N. J., U.S.A.

Electron Microscope Studies on the Micromorphology of Elastomers. Th. G. F. Schoon, Wurzburg.

Wednesday, October 5

Man-Made Fibers

E. Pieper, Wuppertal-Elberfeld, Presiding

Some Relations between Static and Dynamic Properties of Tire Cords. G. Kemnitz and G. Espanion, Cologne.

Carrying Out of Measurements on Tire Cords in Rubber and the Evaluation of the Results. J. K. Van Wunngaarden, Arnheim, Holland.

Modern Viscose Tire Cord in Tires. F. B. Breazeale, Enka Corp., U.S.A.

A New Dielectric Method for Quickly Determining Moisture Content of Tire Cord. E. Haase-Deyerling and H. Meumann, Hannover.

Nylon in Tires. H. G. Lauterbach, Wilmington, Del., U.S.A.

Methods of Testing and Evaluating Cord Twine Fatigue in Tires. Z. Bartha, Budapest, Hungary.

Thursday Morning, October 6

Vulcanization—I

C. Brunger, Hannover, Presiding

Kinetics of Heat-Curing of Synthetic Rubber and the Influence of Additives. W. Scheele, Hannover.

Some Studies on the Activation Energy of Vulcanization. A. Franck, K. Hafner, and F. W. Kern, Munich.

Sulfur Group Analyses in Natural Rubber Vulcanizates. II. Application to Mercaptobenzothiazole Accelerated Stocks. M. L. Studebaker, Akron.

On the Initial Stages of a Scientific Research on Natural Rubber. F. Kirchhof, Neulussheim.

The Diffusion of Sulfur S 35 in Rubber. H. Auler, Aachen.

Possible Uses of the Polarograph in the Rubber Laboratory and Special

Methods of Analysis for Clarifying Vulcanization Processes. F. Mockler and I. Old, Höchst.

Vulcanization of Ethylene-Propylene Copolymers with Peroxides. E. Di Giulio and G. Ballini, Ferrara, Italy.

Thursday Morning, October 6 Testing—I

W. Stegemann, Hamburg, Presiding

The Modulus and Resilience of Polymers in Gum and Black Loaded States and the Effect of Temperature, Frequency, and Amplitude of Deformation on These Properties. D. Bulgin, G. D. Hubbard, and H. Schilling, Birmingham, England.

The Dynamic Properties of Black Loaded Polymers at Amplitudes of Deformation Below 1%. D. Bulgin and T. Lamming, Birmingham.

New Methods for Testing Rubber Vulcanizates. R. Clamroth and R. Ecker, Leverkusen.

New Studies of Abrasion Based on the Dunlop-Lambourn Principle. D. Beckmann, Fulda.

On the Relation of Elastic Constants of High Polymer Substances to Temperature. F. W. Backes, Munich.

Methods for Cold Testing High Polymers. O. Umminger, Marl-Huls.

IR Hardness, Microhardness, and Shore Hardness. F. Handler and P. Kainradl, Vienna, Austria.

Thursday Afternoon, October 6 Special Tire Subjects

W. Kraemer, Hanau/M

Improved Tire Performance with Synthetic Rubber. A. Loulan, Akron.

Cord Paths in Tires. V. E. Gough, Birmingham.

Further Studies on Measurements of Deformation with Extensometers on Tires during Inflation and Rolling. F. W. Kern, K. Hafner, and H. Nippold, Munich.

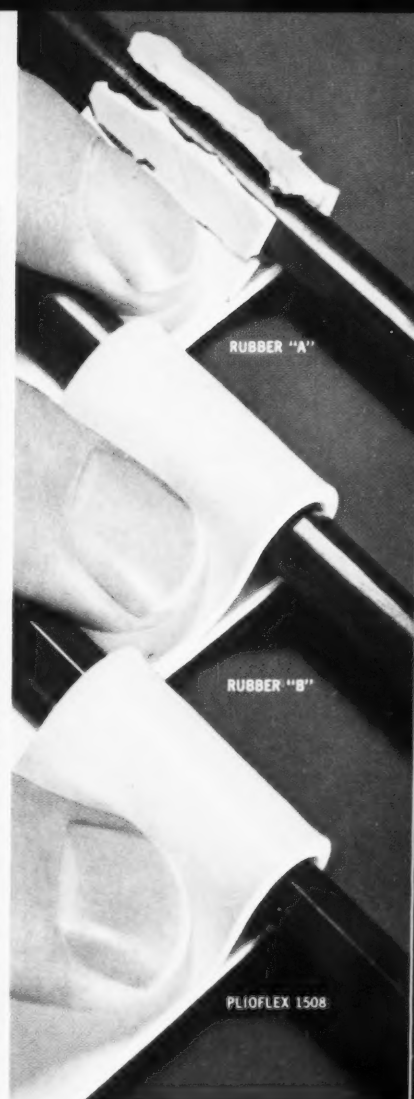
The Origin of Tire Squeal. R. F. Miller and J. G. Slaby, Brecksville, O.

The Radial Stiffness of the Pneumatic Tire. D. H. Cooper, Birmingham.

Thursday Afternoon, October 6 Elastomers—II

W. Klein, Marl-Huls, Presiding

On the Quantitative Infrared Spec-
(Continued on page 14)



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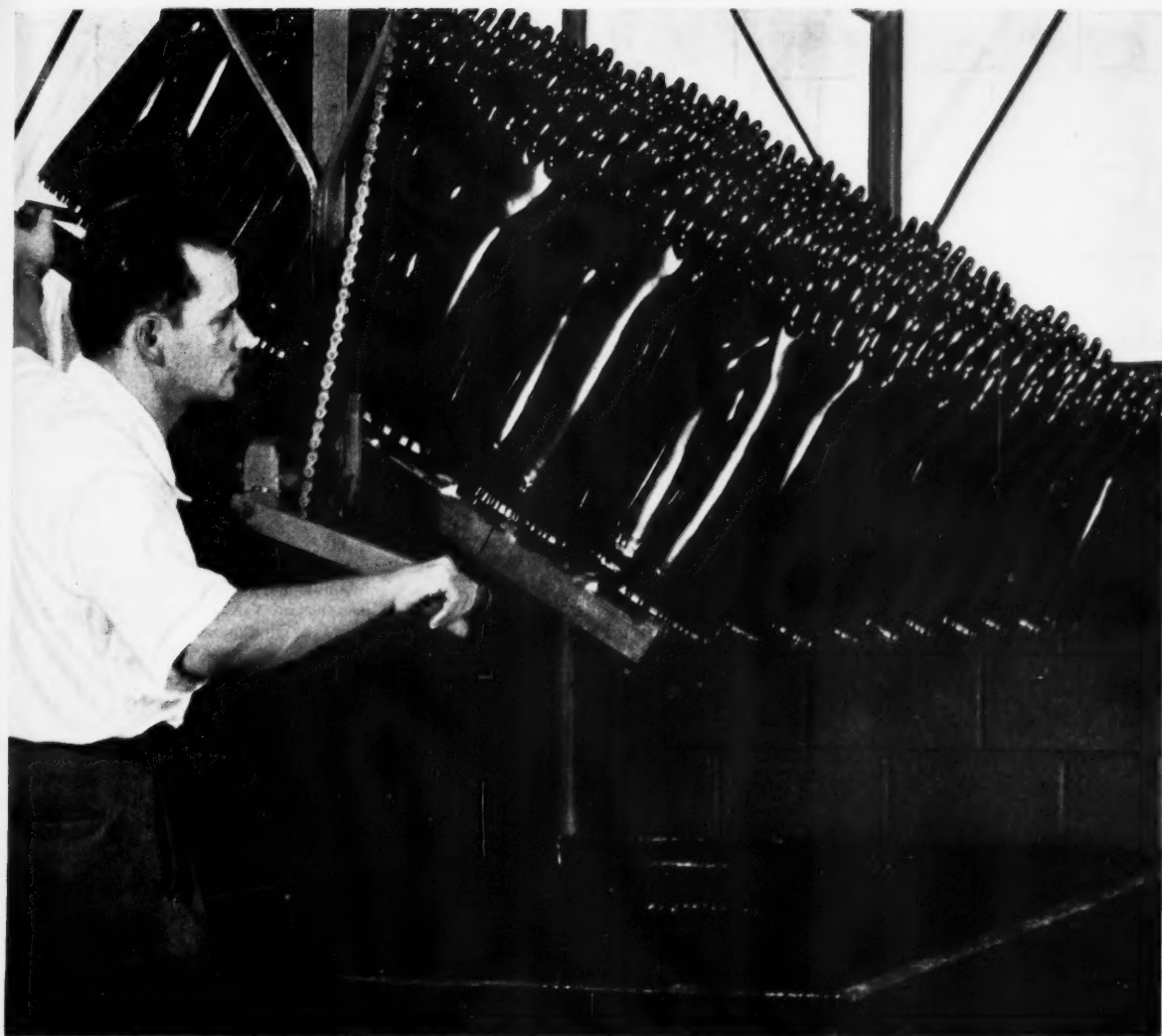


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GOOD YEAR

CHEMICAL DIVISION

Chemigum — T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

news from abroad

(Continued from page 10)

Microscopic Determination of Rubber Isomers. T. Kimmer, Schkopau.

The Identification and Quantitative Determination of Elastomers in Rubber. H. Feuerberg, Berlin-Dahlem.

Measurements of Specific and Latent Heat in Rubber. F. H. Muller, Marburg.

Capillary-Rheometry as a Method for Predetermining Behavior of Neoprene during Processing. C. C. McCabe, N. N. Mueller, and E. K. Ott, Wilmington.

Determination of Small Quantities of Monomers in Latex. J. Brodsky, Gottwaldov, Czechoslovakia.

Friday Morning, October 7

Fillers and Vulcanization

D. Schmidt, Frankfurt/M., Presiding

Reinforcement of Natural Rubber by Carbon Black and High Energy Radiation. A. Lamm and G. Lamm, Paris, France.

Studies on the Reinforcing Effect of Fillers in Vulcanizates. F. Glander, Hannover.

On the Relation between the Physical and Chemical Structure of a Silica and Rubber-Technological Properties. W. H. Albrecht, Duren.

Role of Carbon Structure in the Reinforcement of Rubber—The Effects of Lowered Structure. C. W. Sweitzer, Princeton, N. J., U.S.A.

Experience with Rubber Containing Carbon Black. P. Bernemann, Marl-Huls.

Vulcanization of Natural and Synthetic Rubber by Resins. C. Thelamon, Paris.

Phenol Resins as Curing Agents. A. Giller, Wiesbaden.

Friday Morning, October 7

Technology and Production

H. Hellwage, Munich, Presiding

Researches into Productivity Measurement in the Rubber Industry. W. C. Wake, Shawbury, England.

On Helical Flow in Extruded Goods. S. Eccher, Milan.

Mechanical Strength of Conveyor Belt Specimens in Relation to Defined Flaws. A. Matting, Hannover.

An Economical Method of Producing Latex Foam. A. Sila and J. Leveque, Paris.

Properties of Vulcanizable Systems of Rubbers and Thermoplastics. Ch. L. Bryant, Welwyn Garden City, England.

New Principles for Calculating Properties of Rubber V-Belts. K. H. Bussmann, Berlin-Dahlem.

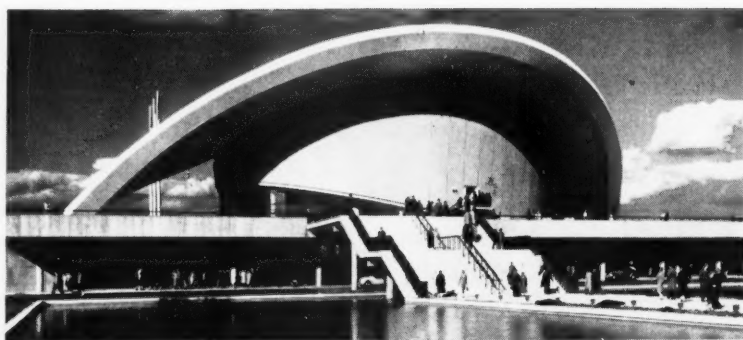
Friday Afternoon, October 7

Aging

W. Scheele, Hannover, Presiding

Oxidative Stress Relaxation Studies of Radiation Cured Vulcanizates, with and without Antioxidant. J. R. Dunn, Welwyn Garden City.

Antiozonants in Oil-Plasticized Rub-



West Berlin Kongresshalle, site of the October, 1961, International Rubber Conference, which is being sponsored by the DKG

ber. Th. Kempermann and R. Clamroth, Leverkusen.

Aging Behavior of Butyl Vulcanizates. D. C. Edwards, Sarnia, Ont., Canada.

Oxidation of Unsaturated Elastomers. E. M. Bevilacqua, Wayne, N. J., U.S.A.

The Mechanism of Ozone Cracking of Rubbers. A. N. Gent, Welwyn Garden City.

Closing Address, DKG Vice President.

Friday Afternoon, October 7

Elastomers—III and Testing—II

P. Stocklin, Leverkusen, Presiding

The Effect of Piperidine on Rubber Solutions. A. Soiminen, Helsinki, Finland.

Variability in Synthetic Rubber Supplies. C. J. Hael and M. G. Peakman, Birmingham.

The Distribution of Foreign Matter in Natural Rubber Supplies. M. G. Peakman, Birmingham.

Tensile Strength of Styrene-Butadiene Rubber Vulcanizates, Reliability and Variations of Measurements. W. May, Delft, Holland.

Influence of the Thickness of Test Vulcanizates on the Tensile Strength Values Measured by the ASTM Standard Method. D. I. Nazeni, Bogor, Indonesia.

Closing Address.

Film Showings

On the morning of October 8 there will be a showing of several films including one on Buna Huls, the new West German synthetic rubber plant at Marl-Huls; one on the production of celluloses and their processing into finished products; on man-made fibers for the rubber industry; one on flexible containers and their use; and one on a large chemical factory servicing the rubber processing industry.

Exhibits

There will be an exhibition of testing equipment and processing machines during the German Rubber Society Congress to include exhibits from Europe and overseas.

The program for the exhibition has

been extended to incorporate displays of testing machines for textiles used by the rubber industry. Products of leading German and foreign firms will be on display. Original spinning machines and models of the types used in the initial stages of man-made fiber production at the end of the last century will be exhibited alongside displays of modern spinning equipment and methods, demonstrating technical progress in this branch of the industry.

Synthetic fibers used in various branches of the rubber industry together with finished rubber products will be displayed. In addition to the latest developments in rayon, prominence will be given to developments in polyamides, polyesters, and others used with natural and synthetic rubber.

Malaya Officially Ends Communist Guerrilla War

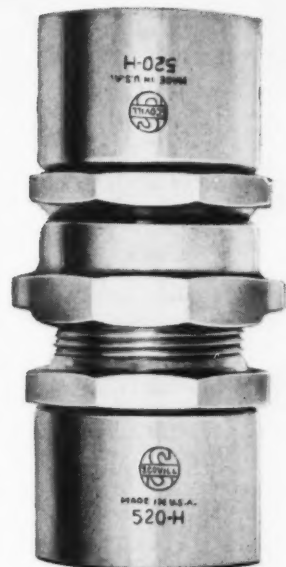
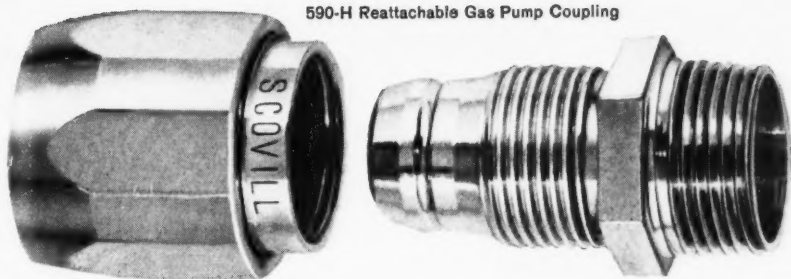
The Federation of Malaya, which just recently recouped the position as the world's Number One producer of natural rubber which it lost temporarily to Indonesia, has ended its 12-year-old guerrilla war against Communist terrorists.

Malaya on July 31 officially closed the book on the bitter struggle by proclaiming an end to the Emergency declared when jungle fighting with Communist marauders began back in 1948.

In June of that year the Malayan Communist Party, even then an outlaw organization, decided the time was ripe for open revolt. There followed a period of murder, rampage, arson, and depredation as Communist guerrillas operating from jungle hideouts terrorized the people and the countryside.

The legal Malayan Government countered with a determined military campaign to block a Communist takeover, break the underground's strength, and mop up the remaining pockets of resistance. The anti-Communist campaign got its biggest boost in August, 1957, when the Federation of Malaya achieved independence and knocked

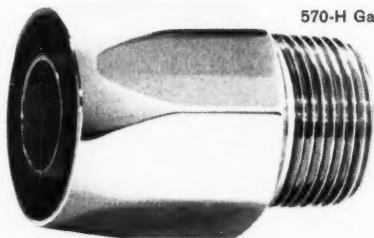
590-H Reattachable Gas Pump Coupling



520-H Fuel Oil Coupling,
Permanently Attached

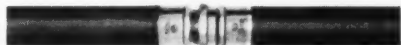
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570-H Gas Pump Coupling, Permanently Attached



*When you next specify fuel oil and gas pump couplings,
ask yourself these 3 vital questions . . .*

1. *Where can I get economical, dependable couplings?* Scovill was the first to design and manufacture couplings for modern hoses—and is, today, the nation's leading supplier of fuel oil and gas pump couplings. With Scovill couplings, you are assured top quality, trouble-free operation. Anchorage on Scovill couplings is positive and permanent (Scovill couplings are subjected to as many as 7,000,000 cycles in flexing tests without signs of failure!) Scovill ferrules are of high strength, cold drawn copper alloy with straight sides that parallel the body. They have rounded edges—will not snag on curb stones or shrubbery. And the retaining grooves in female section hold washer in place—prevents loss when coupling is disconnected!
2. *Where can I get immediate delivery?* Scovill maintains a wide range of strategically placed sales offices and warehouses. They stock a full line of all couplings—from $\frac{3}{4}$ " to 3" in fuel oil couplings . . . and all standard sizes in gas pump couplings. Orders are processed and shipped without delay.
3. *Where can I get immediate service and expert advice?* Scovill has the largest—and the finest—sales and service force in the industry. They stand ready to consult with you wherever and whenever you wish. For complete information, write: Scovill Manufacturing Company, Industrial Coupling Division, Waterbury 20, Conn.



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out one of the Communists' main props of anti-government propaganda—to free Malaya from its colonial yoke. The underground after 1957 was, in effect, engaged in an armed struggle against the Malayan people.

By official decree of July 31, the Federation announced the end of the Emergency—the destruction of the Communist jungle bands and the restoration of peace in the country.

Clay Proposes Joint NR/SR Research Plans

The idea of cooperative research by the natural and synthetic rubber industries, while not altogether new, is still sufficiently alien to many rubber growers to have caused more than surprise when precisely that was urged by Sir Geoffrey Clay, Controller of Rubber Research, in a recent press conference.

"I have always felt that we should cooperate with synthetic rubber instead of divorcing it. There is a need to my mind to blend the field of research into the development, usage, and potentialities of both the rubbers," he is quoted as saying. The synthetic rubber industry is virile, he went on, and may soon be able to produce better types of rubber for particular purposes. On the other hand, natural rubber may in some cases be the answer to consumers' demands. The solution for both, he found, is a combined research project.

American synthetic rubber manufacturers agree with him, he added, and he plans to put the proposal before the Scientific Research Board for consideration when it meets in October. He will also try to get the cooperation of producers and users of synthetic rubber and avail himself of the services of W. E. Cake, vice president of United States Rubber Co., in order to further the project.

Dr. Cake is one of the six leading scientists invited to serve on a coordinating advisory committee on rubber research and development. The other scientists, Sir Geoffrey announced at the press conference, are: Sir Frank Engledow, Professor of Agriculture at Cambridge University; Sir Eric Rideal, former Professor of Colloid Chemistry at Cambridge University; Sir Harry Melville, a polymer chemist and secretary of the Department of Scientific Industrial Research in London; E. A. Murphy, director of research of the central research division of Dunlop Rubber Co.; J. G. Mackay, chairman of a firm manufacturing rubber hydraulic and plastic machinery.

They will work together with six other experts: the Rubber Producers' Council has appointed H. B. Egmont Hake and E. D. Shearn, as its repre-

sentatives; the Ministry of Commerce & Industry and the Malayan High Commission in London will each have a representative; there will be two consumers' representatives, one to be a member of the Dunlop company. In addition, Socfin Co. has been asked to nominate a scientist.

The first meeting of the committee was scheduled to be held at the end of July.

Sir Geoffrey further revealed that technical and legal difficulties have made it necessary to postpone amalgamation of the British Rubber Producers' Research Association, The National Rubber Development Board, and Rubber Technical Developments, Ltd., into a single organization, to be known as the National Rubber Producers' Research Association, as originally proposed. The delay, however, is not expected to affect present research programs.

Urge Common Markets

The proposal by the Singapore Government that a Common Market for the Federation of Malaya and for Singapore be set up is receiving careful attention by the Federation Government, the Minister of Commerce & Industry said during discussions in Singapore. The Federation, it appears, envisages a limited Common Market as a first step toward closer economic cooperation between the two territories, but certain difficulties apparently prevent a full Common Market.

About the same time, the Federation Prime Minister, Tunku Abdul Rahman Putra, on his return from a recent European tour, stressed the need of a Southeast Asian Common Market.

Replanting Continues

Malaya has replanted more than one-third of the rubber area with high-yielding material, according to the Malayan Planting Industries Employers' Association at a recent meeting in Kuala Lumpur.

Out of 3,500,000 acres under rubber in the Federation, 1,250,000 acres have been replanted, and the government is continuing its program of encouraging and subsidizing replanting.

Meanwhile the cost of the scheme, as applied to estates, is turning out to be higher than the original 1955 estimate of \$168,000,000 (Straits), as an amendment to the Rubber Industry (Replanting) Fund Act indicates, which calls for an additional \$20,000,000. The amending bill extends the time limit for planting to December 31, 1962, to allow the inclusion of the

¹Rev. gén. caoutchouc., Apr., 1960, p. 449.

last quarter of the year, regarded as the main planting season.

A recently started scheme aims at the establishment by 1963 of 5,000 acres of seed gardens in the states of Pahang, Johore, and Perak, so as to be able by 1970 to begin to distribute seed of improved clonal material from their gardens among smallholders. The scheme will cost \$9,000,000 (Straits), which will come out of a \$112,000,000 (Straits) allocation from the Federal Government.

Apropos of replanting, R. Fabre, general secretary of the Union des Plantations de Caoutchouc, in an article¹ on the acreage under *Hevea* in the principal producing centers, cites figures to 1959 which show that one-third of the total Asian rubber area (3,413,046 out of 10,119,222 acres) is more than 35 years old, and more than half (5,451,300 acres) is more than 30 years old. Only 1,647,700 acres, or less than one-sixth of the total, was planted between 1950 and 1959.

Technical Advisory Service

A technical advisory service has been set up by the Rubber Research Institute of Malaya for local manufacturers using natural rubber. The service, part of the program to keep natural rubber competitive with synthetic rubber, will disseminate knowledge of the latest advances in rubber technology and factory procedure; it will test rubber quality, suggest remedies for defects, and advise on how to meet technical specifications.

Such services for natural rubber have already been introduced in the United Kingdom and the United States; their establishment in Malaya has been delayed by shortage of staff and equipment.

Red China Expands Rubber Industry

How the rubber industry in China which "prior to the present regime . . . was developing very slowly under the economic pressure of the monopolies of America, Britain, Japan and other countries," is developing under the Chinese Communist party, is described by Tsai Hai Ling in *Soviet Rubber Technology* (March, 1960).

In Old China, most raw materials and processing machinery had to be imported. The machinery was invariably obsolete, and factories were poorly equipped: none had internal mixers or four-roll calendars; assembly work was wholly manual, and productivity very

The advertisement features a large diamond-shaped graphic divided into four triangular sections. The top-left and bottom-left sections are filled with a pattern of small, 3D cubes and contain the text 'QBX-1' and 'general purpose' respectively. The top-right and bottom-right sections are also filled with a pattern of small, 3D cubes and contain the text 'QBX-1E' and 'electrical grade' respectively. In the center of the diamond, the text 'MARBON®' is prominently displayed above 'HIGH-STYRENE', 'MASTERBATCHES', and 'WITH 7 POINTS OF SUPERIORITY'.

QBX-1 and QBX-1E, two new masterbatches from Marbon, are the most economical and efficient form of high-styrene resin reinforcement available today. Many of the time-consuming properties of less-efficient forms have been removed, with resultant increases in production and quality of end product. QBX-1 and QBX-1E, for general purpose and electrical grade, will meet and pass the most rigid tests. We will be happy to send you a sample for your own testing.

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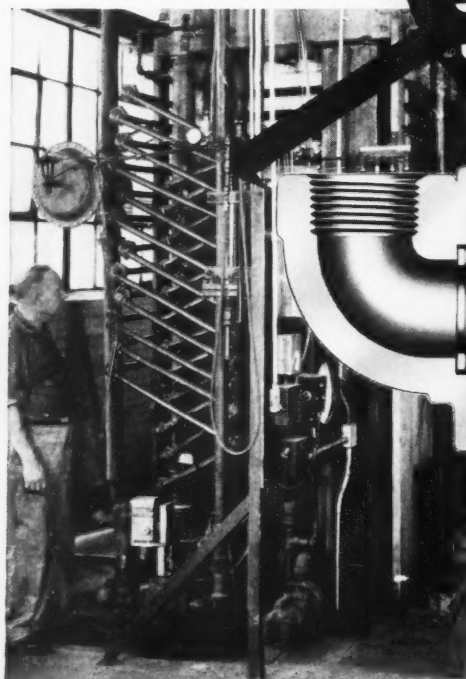
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For Multiple Platen Laminating Presses

THE RICHARDSON COMPANY
MELROSE PARK, ILLINOIS

In appraising production capabilities of new laminating presses, The Richardson Company places maximum emphasis on condensate drainage to insure accurate, uniform temperature control. Barco Swivel Joint piping connections help meet this requirement.



THE RICHARDSON COMPANY of Melrose Park, Illinois, has long been recognized as one of the nation's outstanding operators of molding and laminating press equipment. Utmost care is used in selection and installation of plant machinery. Particular attention is given to the installation of large multi-platen laminating presses. On these, Richardson production engineers wanted a neat, reliable arrangement for steam and water connections to closely spaced movable platens.

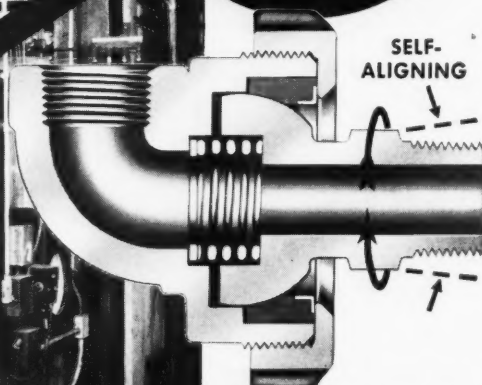
The answer (see photo above) was to install 1" Barco Type S self-aligning, all-bronze Swivel Joints in metal "dog leg" piping. Each line is precisely positioned for perfect steam flow, with no "low spots" to trap condensate. Lines "nest" together when press is closed, yet move readily without interference when press opens. Operating experience has demonstrated that the joints stay tight without leakage and with no danger of blow-outs. When desired, the joints easily handle alternate flow of hot steam and cold water.

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Self-Aligning
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1. SAVE MONEY! CUT COSTS—Barco's new No. 11CT5 gasket is amazingly long wearing! Does not bake hard. Ideal for steam and water service. Does not cause excess wear on other parts.

2. LEAKPROOF, HOT OR COLD—Joints stay tight regardless of pressure or temperature.

3. SELF-ALIGNING—10° side flexibility. This Barco feature saves piping time, cuts costs, and insures perfect performance.

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The Only Truly Complete Line of Flexible Ball, Swivel, Swing and Revolving Joints
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news from abroad

(Continued from page 16)

low. The range of products was restricted to essential goods, but even these were of poor quality. Safety precautions were non-existent; workers were underpaid and always threatened with unemployment.

During the past ten years much of these conditions has been changed. Not only has China's rubber industry expanded after rehabilitation of the war-damaged factories, but the foundations have been laid for the development of domestic natural resources and of local construction of machinery; while several research institutes have been set up, and educational facilities provided to train specialists for the rubber industry. The embargo on raw materials, which hampered China's emerging rubber industry hastened development of domestic resources. Factories for producing butadiene-styrene, butadiene-acrylonitrile, polychloroprene, and other special rubbers have been built or are under construction, and rubber plantations have been started in the south.

Under the old regime, there were no carbon black factories, but now 20 types of carbon black based on local raw materials are being produced; a new process which employs a gas screen is being tested. Activated zinc oxide, several types of accelerators, antioxidants, softeners, etc., are also being prepared. There are factories for making nylon 6 and viscose fiber for high-quality tire cord and other fabrics for industrial use.

Under the first five-year plan (1953-1957) the old rubber factories were reconstructed and equipped with new machinery; at the same time privately owned enterprises were placed under government control. In 1956, private business accounted for 40% of output and employed about a third of the workers of the industry.

Improved equipment and better training of personnel led to improved quality; in 1958 the average life of truck tires was about 31,000 miles, five times greater than that of pre-1949 tires, and the average life of rubber footwear rose to 200-300 days, or four to five times longer. Output of car and truck tires is now 25 times greater than before 1949, and it is claimed that the number of cycle tires now made is equal to the combined output of Britain, France, and West Germany. Output of flat belts is 12 times, and of footwear, four times above the pre-1949 level.

The range of goods has been extended: tire types, formerly restricted to 10 small tires, now number 300, including tractor and aircraft tires. Other new products are pneumatic suspensions for buses and railway stock, large pilot balloons for meteorological studies, rubber gaskets for high vacuum equipment, and other technical goods.

New methods, equipment, and controls in tire vulcanization, the invention of an automatic knife for cutting rubber on the mill, a device for spread-

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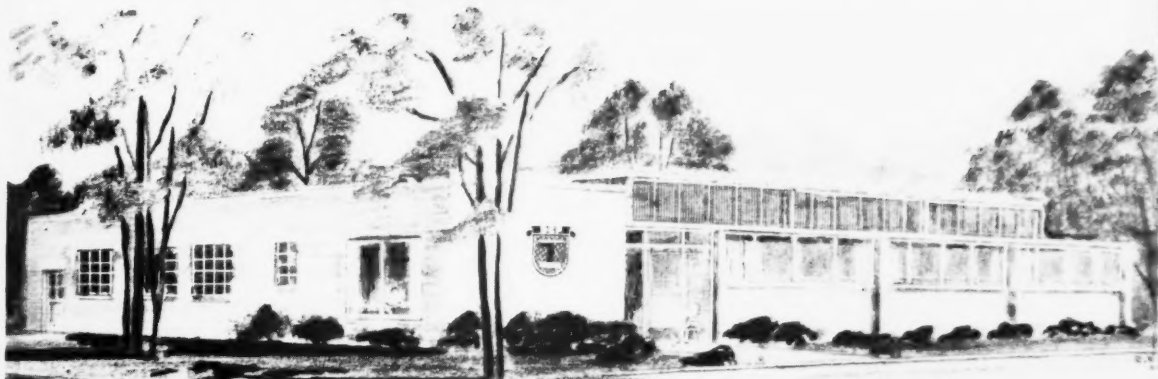
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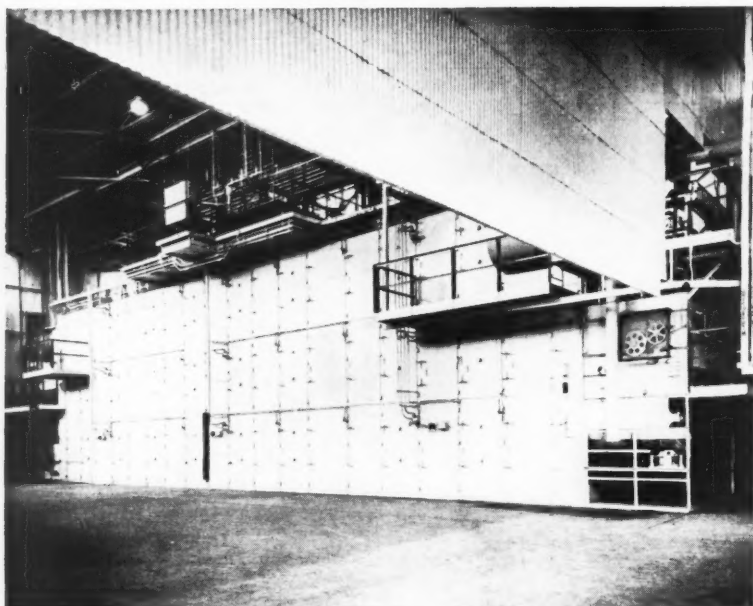


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Uniformly dried, uniformly cooled, uniformly clean rubber crumb ready for baling is assured by Sargent Dryers. The entire process is automatic. Production is high. Performance is guaranteed.

Features developed by Sargent over many years of designing and building rubber dryers include: Silicone spraying at the feed end, to help prevent caking or rolling up of the crumb; Dryer sections zoned in groups with separate temperature and humidity controls; Highly efficient airlocks between dryer and cooler compartments; Breakers and brushes to assure a clean conveyor, and to reduce maintenance time and cost; Design that solved the dust problem — collectors are not needed at exhausts; A single housing for dryer and cooler — increases efficiency, speeds the process cycle, lessens possibility of contamination of stock; Housing is covered with full height hinged doors and easily-removed panels for easiest possible cleanout, in least time; Every known

safety device for protection of personnel, machine and stock; An exclusive, precision pre-assembly method that makes Sargent equipment the easiest and the quickest — and at lowest cost — of any dryer on the market to install in customer's plant.

Gas burners, safety certified of course, may be mounted on top of the dryer section for more efficient operation, easier servicing. Heat source for Sargent Dryers may also be oil, steam or electricity.

Shown above is a recently installed gas-fired, 3-pass synthetic rubber dryer with cooler. Only 2 gas burners are needed to bring this dryer up to working temperature in less than ten minutes.

Sargent experience and engineering can help you save time, money, man-hours in your drying process, producing a top quality, uniform quality product. Let us give you details.

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news from abroad

(Continued from page 18)

ing adhesive on rubber footwear, and an automatic method of removing lasts from footwear are all promoting efficiency. Experimental work on metal cord reinforcement of tires has been completed.

Machinery factories are now building internal mixers, large four-roll calendars, and other heavy equipment for the rubber industry.

In all this work China has been aided by the Soviet Union, Czechoslovakia, and other Soviet bloc countries.

Despite the unprecedented rate of growth, the rubber industry does not yet satisfy the needs created by the expanding industrialization of the country and the mechanization and electrification of agriculture. The increased requirements in 1962, as against those for 1958, are expected to be 250% for motor tires, 270% for cycle tires, 370% in belting, and 40% in rubber footwear.

Borneo Areas Seek To Increase Rubber Yield

British Borneo, which includes the states North Borneo, Sarawak, and Brunei, stretching across the northwest of the island, exported 68,466 tons of rubber in 1959, compared with 62,400 tons the year before. Of this 1959 total, Sarawak contributed 43,929 tons; North Borneo, 22,890 tons, and Brunei, 1,647 tons. Figures for Sarawak in the first four months of 1960 come to 17,775 tons, contrasted with 11,094 and 10,649 tons in the same periods of 1959 and 1958, respectively. This increase is notable, especially since it had been reported in the House of Commons that four Members of Parliament who had visited the state early this year found rubber planting there inefficient and ill-organized.

The Rubber Growers' Association report for 1959 states that the Government of North Borneo introduced a Replanting Fund Ordinance for the industry in 1954, providing for a rubber export cess of 31% of the rubber price, with a minimum of 2 cents (Straits) a pound. The proceeds of the cess go into a Fund A for estates over 250 acres, and a Fund B for smallholders. The estates may claim a refund to cover costs of replanting and new planting. Through Fund B, smallholders are supplied with high-yielding material and fertilizer. By the end of 1959, smallholders had thus been enabled not only to replant 2,000 acres of old rubber, but to plant some 40,000 acres of new land with modern high-grade material. In addition, some thousands of acres were planted with ordinary seedling rubber for bud-grafting.

Experienced local planters expect North Borneo's rubber production to more than double in the next 20 years.

Indonesian South and East Borneo, once Netherlands Borneo, was one of the earliest sites of rubber planting by

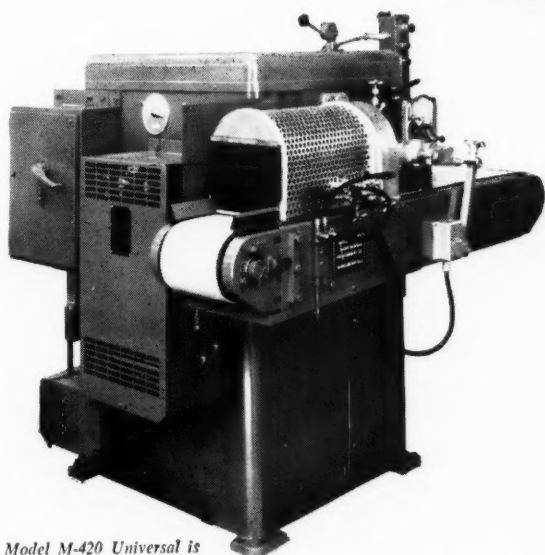
(Continued on page 28)



Typical rubber part molded from preps cut automatically by Wink Cutter at Monarch Rubber Co., Hartsville, Ohio.

"Wink Cutter saves us 50 manhours a day..."

Monarch Rubber Company automates cutting of mold preps; eliminates double handling; speeds operations



Model M-420 Universal is a completely automatic machine for both continuous and intermittent cutting. Pays off on short or big runs. The built-in metering conveyor elements transport the uncut stock to the knives, precisely measure the length of cut and move the cut stock away from the blades. Wink actually measures while it cuts from four points simultaneously. It does not depend upon timing or synchronization with another unit or machine—does not cut against a dead element but against another live knife.

New—Large cutter handles up to 6-inch diameters. Write for information.

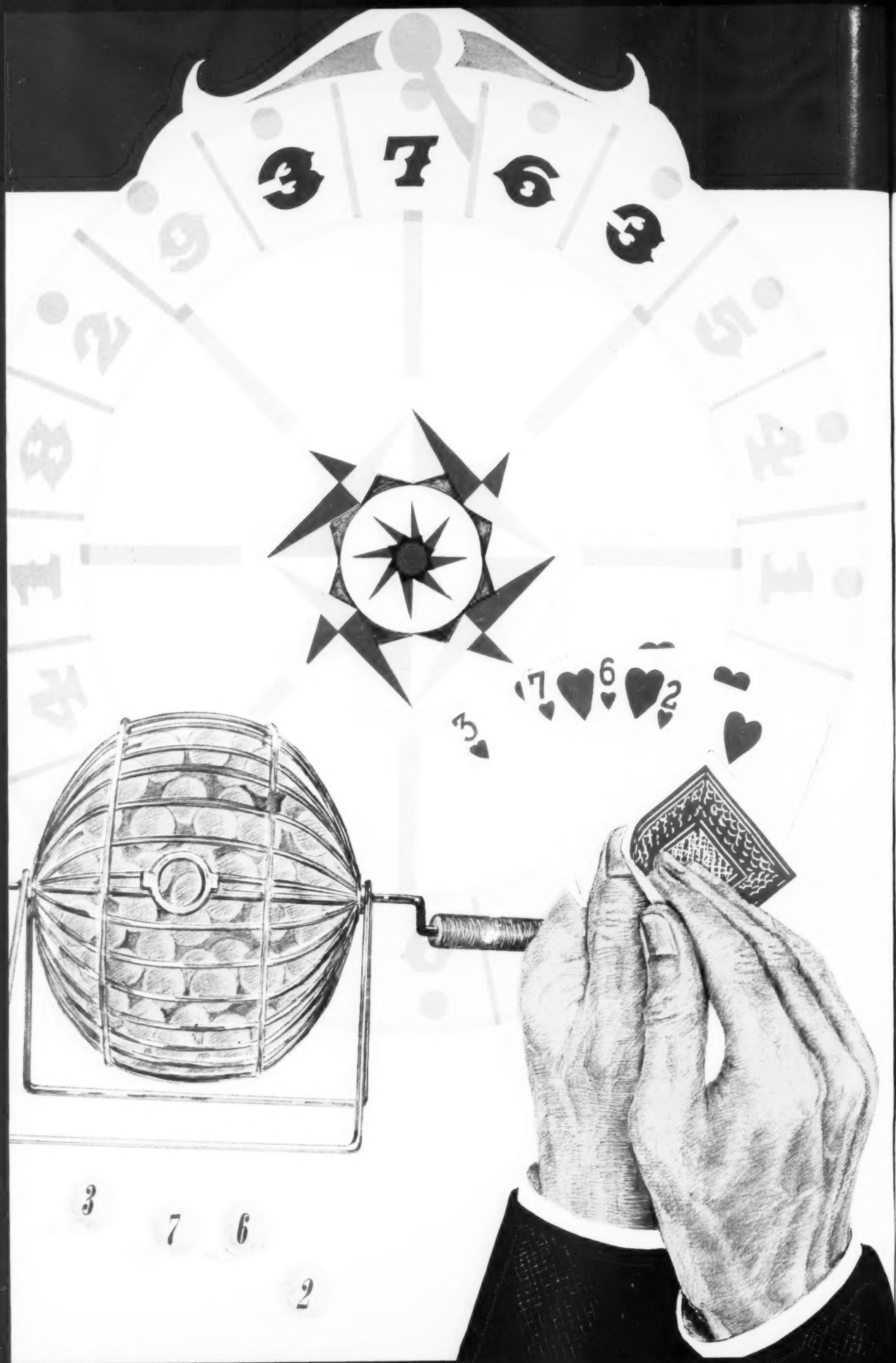


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"The Wink Cutter has really paid off for us in cutting mold preps", reports Monarch Rubber Company, producers of a wide range of molded rubber products. "By automatically cutting mold preps right at the extruder, at rates up to 1500 pieces a minute, we're saving 50 man-hours a day." In this operation, the extruded material was formerly cut into long strips, transported to a guillotine cutter, unloaded, and cut at much slower rates.

Accuracy of the Wink Cutter also saves money for Monarch. The Wink unit cuts each piece within a fraction of an ounce. By holding weight of each piece so closely, flashing in the mold is reduced, minimizing waste material. "It's the most accurate machine we've run across", reports Monarch, "and this is important in big production runs."

Wink Cutters can help you reduce costs in cutting rubber, both raw and cured, plastics, impregnated fabrics, reinforced hose, natural and synthetic fibers, ceramics, candy ... even sticky or viscous materials. Write today for Bulletin W-100... it lists complete engineering information. Contact Motch & Merryweather Machinery Company, Wink Cutter Division, 1250 East 222nd Street, Cleveland 17, Ohio.



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For superior wear resistance,

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Carbomix® 3762 is composed of:

- 100 parts rosin acid emulsified polymer (COPO 1500)
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- 5 parts highly aromatic processing oil
- 1.25 parts staining stabilizer

When an oil extended black masterbatch is desired, choose **Carbomix® 3763**. It is composed of:

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- 55 parts super abrasion furnace black
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- 7.5 parts highly aromatic processing oil
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Carbomix® 3762 and **3763** are superior masterbatches designed for you to provide rigid high quality specification products.

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Copolymer's unique dispersant-free **Carbomix®** process provides these black masterbatches with the ultimate in physical properties not obtainable by dry mixing.

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In addition, these masterbatches offer the mixing economies you have grown to expect from all **Carbomix®** masterbatches.

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BUSY BELT—Union Lumber Company of Fort Bragg, California, operates one of the three largest redwood lumber mills on the Pacific Coast. They specialize in redwood lumber and veneers, as well as numerous by-products. Virtually nothing is wasted. The redwood bark is used to make fiber packing pads and the redwood chips are sold for the production of fiber-board. It is essential that the mill operate almost continuously. To promote smoother running and help prevent emergency shut-downs, Union Lumber had installed this 2,000 foot conveyor belt to carry sawdust and scrap away from the various machines. The belt, made by the Boston Woven Hose & Rubber Division of the American Bilrite Rubber Company, has been in operation for five years — and is expected to serve an additional ten years. The sturdy, wear-resistant carcass of the belt was fabricated from one of Mount Vernon Mills' synthetic fabrics.

This is another example of how fabrics made by Mount Vernon Mills, Inc. and the industries they serve, are serving America. Mount Vernon engineers and its laboratory facilities are available to help you in the development of any new fabric or in the application of those already available.

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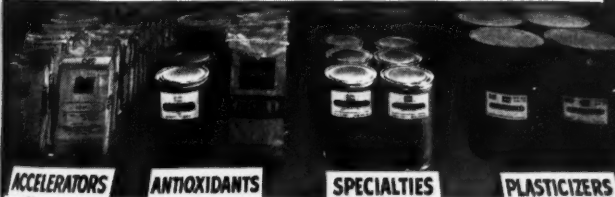
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SANTOWHITE CRYSTALS SANTOWHITE POWDER

Economical, relatively powerful, easily dispersed antioxidants—surest protection against deterioration from heat, sunlight, and oxygen—especially valuable even for large exposed surface areas of films and foams.

For the *one* best balance of protection, economy and ease of use in your latex compounds, plus good nonstaining and non-discoloring characteristics, take a look at Monsanto's family of SANTOWHITE antioxidants. They give you an exclusive range of properties to answer your latex compounding needs in foams, adhesives, spreading and casting formulations. Monsanto will be pleased to work with you on your specific needs. For samples, just use the convenient coupon.



**Let Monsanto Rubber Chemicals Answer
Your Next Compounding Question**

Jot it down on your letterhead. No obligation—no salesman will call (unless you so request). To help you solve specific problems, Monsanto draws from basic knowledge of more than 85 rubber chemicals and over 18,000 compounding studies. Write, today.

MONSANTO CHEMICAL COMPANY
Rubber Chemicals Department
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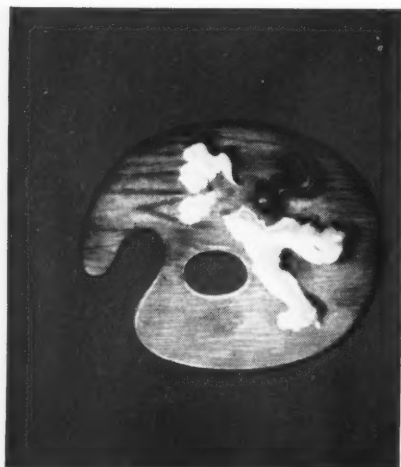
ENJAY BUTYL

IS TOPS IN ALL-'ROUND



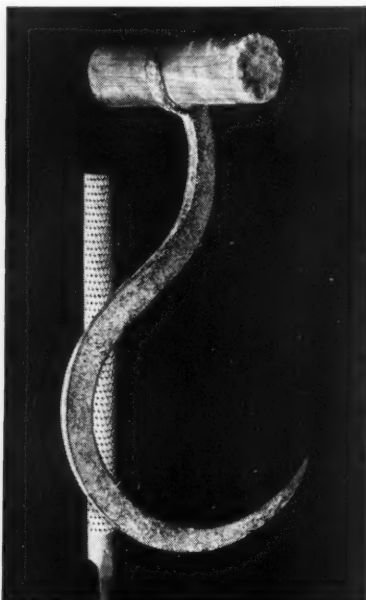
RESISTANCE TO CHEMICALS

Enjay Butyl, because of its unique and extremely low degree of unsaturation, offers excellent resistance to corrosive chemicals. The preferred rubber for tank linings, hose, seals, gaskets and other applications where exacting chemical resistance is required.



VIVID COLORS

Enjay Butyl requires no additives for quality coloring over a wide range of hues. Famous for colorability and smooth finishes, Butyl has been successfully plastic coated for special applications.



RESISTANCE TO TEAR AND ABRASION

Enjay Butyl offers the highest aged tear strength of any rubber . . . even after long exposure to ozone and heat! Its inherent toughness resists abrasive wear, in such applications as tires, conveyer belts, hose and other mechanical goods.

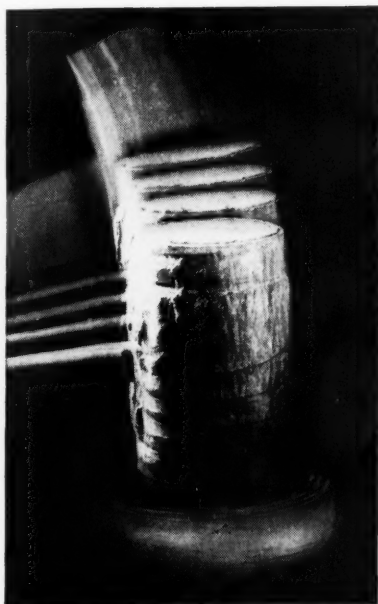
RESISTANCE TO SUN- LIGHT AND WEATHERING

Enjay Butyl has proven its resistance to ultra-violet light, ozone, oxidation, moisture and mildew. Increases life of products such as weatherstrips, garden hose, wading pools and automotive parts.



RUBBER

PERFORMANCE



DAMPING PROPERTIES

Enjoy Butyl absorbs shock and vibrational energy more completely than any other rubber. Resiliency can be varied in compounding and processing. Butyl is ideal for axle and body bumpers, motor mounts and sound-deadening applications.



IMPERMEABILITY TO GASES AND MOISTURE

Enjoy Butyl is tops in impermeability to gases and moisture . . . retains air pressure 8 times better than natural rubber. Outperforms other rubbers in such application as inner tubes, jar and bottle seals, hoses and inflatable goods.



ELECTRICAL RESISTANCE

Enjoy Butyl tops all vulcanizable rubbers in electrical and dielectric properties . . . in resistance to corona and ozone breakdown and water absorption. Its high dielectric strength insures against electric breakdown under normal or surge voltage. Its heat resistance permits higher current flow for a given conductor size.

The outstanding properties of Butyl Rubber create new horizons for the designer, and offer to manufacturers an opportunity to utilize the qualities of rubber in applications never before possible. The unique properties of Butyl have led to vast improvement in many existing products. Technical skills will open the way to countless new uses.

Butyl is the "idea" rubber with uses stretching as far as the imagination can reach. We'll be glad to tell you all about it. Just contact the nearest Enjoy office.

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"Instronalysis".
what
is it?



The Instron comes in various models and sizes, to suit the widest applications — for tests under all sorts of environmental conditions. ILLUSTRATED: FLOOR MODEL—load ranges from 2 grams to 10,000 lbs.



Interesting studies on the rheological properties of viscoelastic materials are available in Bulletin PC-2 and R-3. Reprints on many other fields of testing are also available for the asking.

"Instronalysis" means in-depth testing of materials with the Instron Universal Tester. You won't find the word in Webster's, but it is a term of importance to every laboratory concerned with modern testing techniques.

That's because today's technology demands nothing less than in-depth testing. Stress-strain curves alone are no longer adequate to measure the characteristics of long-chain molecular materials and other new "miracle" products. Today's tester must be able to determine the effect of different strain rates at various temperatures, energy loss under repeated cycling, stress relaxation and recovery, recoverable and unrecoverable creep, and many more characteristics beyond the scope of conventional equipment.

"Instronalysis" brings together both routine and advanced testing techniques within easy reach of a single instrument. It's what we mean when we say "You can do more with an Instron."

INSTRON
ENGINEERING CORPORATION

2011 Washington Street, Canton, Mass.



news from abroad

(Continued from page 20)

smallholders in the area, and substantial amounts of rubber are produced here still. Some of the trees are very old, and many are now approaching their thirtieth year. In 1958, the Indonesian Peoples' Rubber Bureau started a program to replant 120,000 acres in South and East Borneo by 1965. This year more than 20,000 acres are scheduled to be replanted.

Ceylon Replanting Is Reported Progressing

Ceylon expects to have about 200,000 acres of the country's 660,000 acres replanted with high-yielding rubber when the government's second Five-year Plan ends December 31, 1962, according to the 1959 report of the Rubber Growers' Association. The replanting scheme for Ceylon, started in 1953, was aimed at replanting 65,000 acres in the five-year period 1953-1957, but in fact 90,206 acres were replanted. The first replanting plan was financed by a cess on rubber exports. Present costs of about 20,000,000 rupees a year are largely covered by economic assistance of 15,000,000 rupees a year which the Chinese Government has agreed to extend under the Economic Aid Agreement. The balance is met by the Ceylon treasury.

Rubber production in Ceylon in 1959 was only 91,696 tons, against 100,196 tons in 1958, the lowest figure since 1949, when output was 89,500 tons. Exports were 92,013 tons in 1959, against 90,240 tons in 1958; shipments to China accounted for 23,204 tons, against 23,640 tons in 1958.

The RGA report refers to reassuring statements on nationalization of estates in Ceylon made by leading local politicians during 1959 and even up to January, 1960. But the continuation of this policy seems to depend on the outcome of the general elections scheduled for July 20, 1960.

The Sri Lanka Freedom Party (SLFP) of the assassinated Prime Minister, S. W. R. D. Bandaranaike, now headed by his widow, has entered a no-contest agreement with the Marxist LSSP (Lanka Sama Samaja Party) and the Communist Party "in order to form an independent and stable government with absolute majority in Parliament." The Marxists had been roundly defeated at the polls last March, but their alliance with the SLFP will give them new strength; moreover, it is feared that they will have no difficulty in taking over effectual leadership from the political novices at the head of the SLFP, if this party comes to power.

Preelection statements have softened nationalization of estates, a pet aim of the Marxists, but it is significant that the leader of the LSSP made no comment when reporters questioned him on this point.

RUBBER WORLD



for color that's bright, color that sells...

CYANAMID BENZIDINE PIGMENTS

Benzidine Yellow 45-2555 • Benzidine Orange 45-2850

Offering exceptional brightness, these chemically stable organic pigments impart strong, highly visible colors to a wide variety of rubber products. They are non-migrating, non-darkening and stable to acids, alkalis and sulfurous chemicals.

Cyanamid Benzidine Pigments are available in a wide range of colors, from bright lemon yellow to clean, rich oranges, for bathing caps, balloons, toys and miscellaneous druggists' sundries.

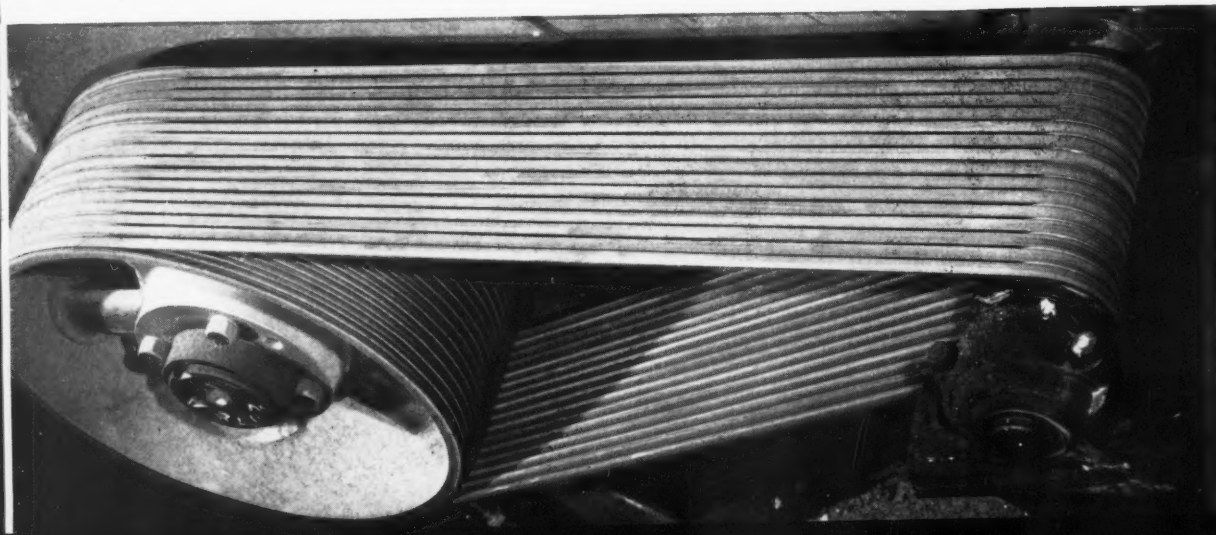
Your Cyanamid Pigments representative will be glad to provide you with samples and full information for making the most effective use of Benzidine Pigments in your rubber products.

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COLOR IS THE DIFFERENCE





Gen-Tac[®]

the universally-accepted cord adhesive

helps win the battle against speed and heat

Gen-Tac solves the problem of achieving better rubber-to-cord adhesion to meet today's faster speeds and higher horsepower! This unique vinyl pyridine latex provides dynamic adhesion between rubber and rayon, nylon, dacron and other types of cord—helping make better belts than ever before.

If you manufacture fabric-reinforced rubber products, let us show you how you can improve them with Gen-Tac . . . write or call today for valuable information and technical data on this and other Chemical Division products.

Gen-Tac offers:

- Maximum rubber-to-cord adhesion
- Excellent freeze/thaw stability
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- Less squeeze roll build-up

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CHEMICAL DIVISION • AKRON, OHIO**

Chemicals for the rubber, paint, paper, textile, plastics and other industries: GENTRO SBR rubber
GENTRO-JET black masterbatch • GEN-FLO styrene-butadiene latices • GEN-TAC vinyl pyridine
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new products



Curtiss Wright Air Car rides on a cushion of air directed to the ground by the urethane skirt that runs the circumference of the vehicle

Uscothane Elastomer Used on C-W Air Car

A new group of elastomers, called Uscothane, is now being used in a wide range of rubber-like, abrasion-resistant materials. Produced by the interaction of diisocyanates with hydroxy-terminated polyesters or polyethers. Uscothane's special properties are controlled by polymer chemistry, by time and temperature of cure, and by mixing conditions. The new material was recently introduced by the United States Rubber Co., New York, N. Y., at the firm's display in the 1960 Design Engineering Show in the New York Coliseum.

The new urethane elastomers range from very soft to hard and from flexible to rigid in construction, depending on the formulation of their raw material. Owing to their exceptional abrasion-resistant properties, these elastomers are expected to find widespread use in industrial applications.

The revolutionary, recently introduced Curtiss Wright Air Car, for example, uses the new material on the skirt around the circumference of the vehicle. When the car is floating on a "cushion" of air, as the vehicle moves about, this skirt comes in contact with all types of conditions, wet and dry, including gravel, concrete, sand, rock, and other types of land surfaces.

Exposure to all kinds of weather will not harm Uscothane constructions, it is further declared. Uscothane also has good resistance to ozone attack

(Continued on page 44)

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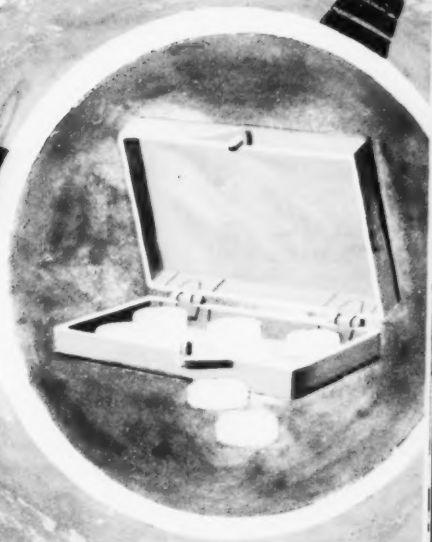
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Firestone PRODUCT- SPECIALIZED POLYMERS

FOR THE ALL-STAR
LINEUP OF SYNTHETIC
RUBBERS AND LATICES...

JUST
TURN
THE
PAGE!

HOT RUBBER TYPES

FR-S 181—A light-colored, non-staining, non-discoloring lowest plasticity rubber, especially tailored to the processing of chemically blown sponge because mixing time is reduced and no peptizing agents are necessary.

FR-S 1000—An exceptionally versatile, general purpose rubber. Excellent results in most black or dark compounds. Easy processing characteristics; especially useful in making hard rubber products, such as molded and extruded goods, tire body stocks and treads.

FR-S 1001—Combines good aging properties with only slight stain and discoloration tendencies. Special end uses: light-colored shoe soles, heels, floor tiles, moldings and extrusions. Like all FR-S butadiene-styrene polymers, it is easily processed, highly uniform.

FR-S 1004—Low in water absorption and water-soluble impurities. Special uses: electric insulation and battery cases; can-sealing compounds and food jar gaskets. Good physical properties; ages well.

FR-S 1006—Ultra-light-colored,

non-staining polymer; minimum of costly white pigment required; adds impact strength to light-colored plastics. Special uses: white sidewall tires, floor tiles, coated fabrics, shoe soles, household goods.

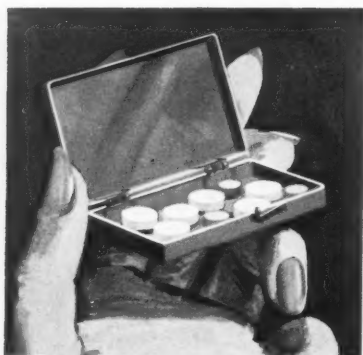
FR-S 1007—Low voltage electric grade rubber with low water-absorption properties. Special uses: electrical applications as in wire and cable insulation; excellent for a variety of hard rubber articles and gaskets.

COLD RUBBER TYPES

FR-S 1500—High tensile; easy to

PRODUCT-SPECIALIZED FR-S RUBBERS

for thousands of low-cost applications



FR-S 195, SOLUBLE IN STYRENE, SHATTERPROOFS PLASTIC "PILL BOXES." Exceptionally light colored and non-staining, FR-S 195 is "the finest polymer" for products of high-impact polystyrene: plastic cases for radios, razors, cosmetics, etc. Breakage is minimal. Rigorously inspected to polystyrene standards for cleanliness, viscosity, dissolving time, FR-S 195 with styrene shows no yellow, gels or cloudiness, nor imperfections from faulty mixing such as fisheyes and orange peel.



RUBBER TILE BREAKTHROUGH! **FR-S 147** NOW OFFERS ALL THE PROPERTIES REQUIRED FOR TOP TILE SERVICE. FR-S 147—a super-refined rubber with a better-than-ever finish—now brings faster processing and low, low costs to rubber tile. One plant reports almost doubling its processing of rubber flooring mix with FR-S 147. Now rubber can prove and *sell* its competitive advantages over other tiles—by profitably matching their price appeal.

process; good building tack. Special uses: camelback, all tire stocks, hard rubber and mechanical goods and any products requiring premium physical properties.

FR-S 1502—Light color; non-staining; high loading capacity; flex-resistant. Special uses: white sidewall tires, kitchenware, hospital goods, sporting goods, coated fabrics, shoe soles and heels.

FR-S 146—Light color; non-staining; low plasticity; easy processing. Excellent for chemically blown sponge products, shoe soles, sporting goods, extruded items and a variety of mechanical goods.

FR-S 179—A base polymer for oil-extending rubber; extremely high viscosity. Economical, it allows compounder to add amount and type of plasticizer as desired. Good physical characteristics; excellent for mechanical goods.

OIL-MODIFIED TYPES

FR-S 184—New, improved, stabilized for tread rubber use oil masterbatch; 37.5 parts aromatic oil. Special uses: quieter riding, squeal-resisting tire treads that deliver extra mileage, camelback, me-

chanical goods and extruded parts. Distinctive for stability in storage, mixing and extruding.

FR-S 1710—This outstanding rubber combines 37.5 parts of non-volatile aromatic oil with a specially prepared polymer. Easily processed; more economical compounding of tire treads, mechanical goods, molded parts.

FR-S 1712—Combines a highly aromatic non-volatile oil with a specially prepared polymer. Great savings in manufacturing tire treads, camelback, motor supports, auto insulators. Its physical properties permit use of additional oil when added economy is desired.

FR-S 173—A greatly improved polymer in color, cured hardness and processibility. Used in mats, shoe soles and extruded and mechanical goods. Contains a non-staining antioxidant and 25 parts of a light-colored naphthenic oil.

FR-S 178—An economical, light-colored, non-staining rubber, extended with 37.5 parts of naphthenic oil. Offers improved color, cured hardness and processing properties particularly desirable in

mats, shoe soles and extruded and mechanical goods.

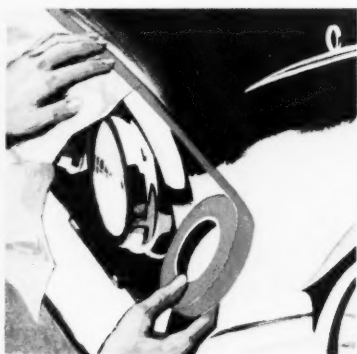
SPECIALTY TYPES

FR-S 1009—A non-staining polymer used with other rubbers to smooth out and speed up calendaring and tubing and to avoid distortion of uncured products. Increases dimensional control in manufacturing insulated wire, hose, calendered sheet goods, coated fabrics.

FR-S 1012—High polymer viscosity, combined with solubility in solvents. Widely used for asbestos sheet, packing, gaskets, brake lining and high viscosity cement; non-staining; high tensile strength and high modulus when cured.

FR-S 1013—A special-purpose, high-styrene rubber used in closure and can-sealing compounds. Low content of water-soluble properties, low water-absorption properties and relatively high uncured strength. Produces strong adhesives, may be used in contact with light finishes.

FR-S 1014—Made with a rosin soap emulsifier; offers exceptionally good tack and green tensile properties. Widely used in adhesives, can-sealing compounds, industrial tapes.



MASKING TAPE WITH FR-S 182: A COST-CUTTING PRODUCT IN ADHESIVES AND OTHER APPLICATIONS. A non-staining, non-discoloring styrene butadiene copolymer, FR-S 182's light color and high uncured strength make it particularly suitable to developing exceptionally strong adhesives. Other applications: can-sealing compounds, coated fabrics, molded and extruded products. Low in water-soluble impurities, FR-S 182 also has low water absorption characteristics; has a bound styrene content of 43 per cent.



NEW FR-S 201: A LOW-PRICE, NON-STAINING POLYMER THAT REDUCES COMPOUNDING COSTS. The most economical rubber, new, further-improved FR-S 201 is a perfected 50-part oil-extended polymer that reduces compounding costs to a new low. Its non-staining and light color characteristics—and its low cost—tailor it to volume use in such products as refrigerator door gaskets, rubber matting, housewares, appliance parts.



HIGH-STYRENE MASTERBATCH FR-S 158 ELIMINATES DIFFICULT AND COSTLY MIXING OPERATIONS. A 50-50 masterbatch of 1502 and a reinforcing high-styrene resin, FR-S 158 is compounded in the latex state for perfect dispersion and fast, efficient mixing operations. Shipped in easily compounded pellets, FR-S 158 imparts special stiffness or hardness, good physical characteristics, abrasion resistance, moderate flex resistance to light-colored rubber products, such as shoe soles, flooring, high-pressure tubing.

FR-S LATICES

*with the precise characteristics
and production economies
you are looking for*

FR-S 200—THE NEWEST AND MOST OUTSTANDING SYNTHETIC LATEX DEVELOPED FOR THE FOAM RUBBER INDUSTRY. Designed for use in all foam applications, either 100% or in combination with some low-ammonia natural latex. Properties: superior processing characteristics, very high solids content provides excellent gel sensitivity, good structure, accepts higher pigment loading.

LOW-COST FR-S 176 FOR TEXTILE-COATING COMPOUNDS. For carpet and upholstery backing that upgrades feel and appearance in any fabric—for better adhesives, for saturated papers—FR-S 176 is, *penny for penny*, the highest solids latex available (49% solids). Highly resistant to ultra-violet light, heat aging, gas fading. Stable to mechanical action and to compounding ingredients. Another economy plus: its reduced water content means less drying time. Whatever your problems, your compounder can use this cost-shaving latex to your distinct advantage.

FR-S 174 PROVIDES INCREASED "HAND," MORE STIFFNESS AND STRENGTH IN CARPET-BACKING COMPOUNDS. Tufts locked in, problems locked out—that's the sales-stimulating story of FR-S 174 when used in carpet-backing compounds! A styrene-butadiene resin latex, FR-S 174 is an ideal stiffening agent for both natural and synthetic latices. It provides increased "hand," rigidity and rip strength for carpet-backing and foam. 50% solids.

FR-S 2000—The most widely used latex for its economy, stability and high tensile strength. Used for flexible, durable upholstery, textile and carpet backing; or with resins to saturate tire cords for greater adhesion. Good for pigment and fiber binding. 42% solids.

FR-S 2001—Outstanding for paper saturation in both beater and web processes. Used to increase flexibility

and tear strength. Highly stable, and offers lower molecular weight for better adhesion, still retaining good tensile strength. 42% solids.

FR-S 2002—For premium back-sizing applications requiring extra light color. Excellent for upholstery and pile carpet; will not discolor conventional dyes. Can be sulphur-vulcanized; provides flexible coatings and films with very good strength. 50% solids.

FR-S 2003—A high-solids latex specially desirable where light color and low cost are important. Cuts costs by improving foam compound stability. Also used as a resin and plastics additive for better strength and flexibility. 60% solids.

FR-S 2004—A polybutadiene polymer latex which has a particular application in the manufacturing of high-impact plastics. It also is excellent for specialized latex foam uses, where light color and freedom from odor are important. 59% solids.

FR-S 2006—A superior chewing gum base, this latex may also be co-coagulated with rubber pigments for dry masterbatches with excellent dispersion and good processibility. Increasingly popular for asphalt paving and roofing. 28% solids.

FR-S 2105—A general purpose high-solids latex combining high tensile strength with low-temperature flexibility. Cuts manufacturing costs of foam products and offers excellent strength, flexibility and pigment loading capacity for backing and sizing of carpets and textiles. 62% solids.

Specific applications of Firestone Rubbers and Latices to your specific needs count most. That's why you'll find it worthwhile to fill out and send in this coupon—soon.

Firestone

SYNTHETIC RUBBER & LATEX COMPANY, AKRON 1, OHIO



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INSERT—21

Firestone Synthetic Rubber and Latex Company, Akron 1, Ohio

MY BUSINESS IS _____

MY CHIEF PRODUCT OR PRODUCTS: _____

Please send me further information on the product numbers I have circled here, as well as additional copies of your folder on Firestone Product-Specialized Polymers.

Synthetic Dry Rubbers:	147	195	182	201	158	181	1000
	1001	1004	1006	1007	1500	1502	146
	1712	173	178	1009	1012	1013	1014
Latices:	200	176	174	2000	2001	2002	2003
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POSITION _____

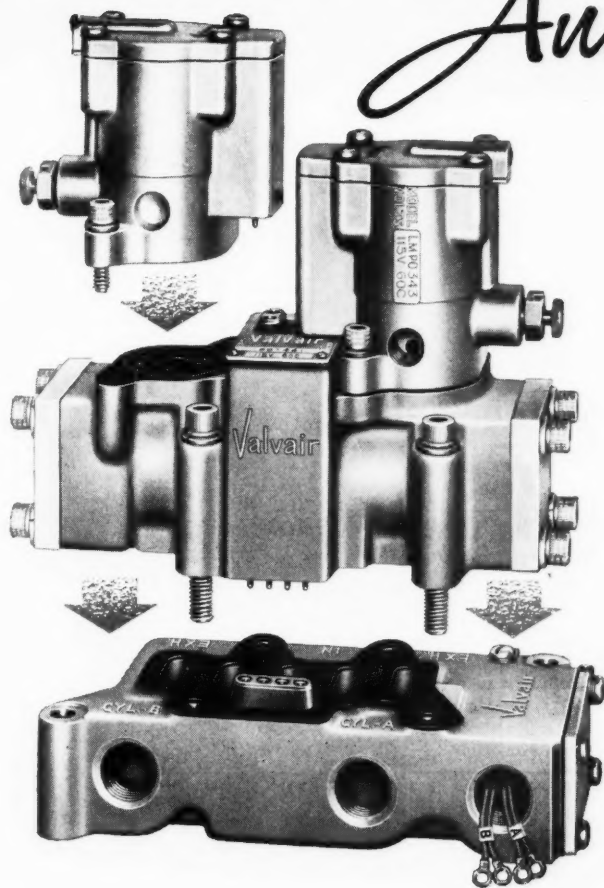
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Announcing

VALVAIR® 1/2" NPT PLUG-IN VALVES



MODEL PD-441 shown. 4-way single or double pilot-operated types, for sub-base or manifold mounting. Aluminum and stainless steel components assure multi-million cycle dependability. Interchangeable pilots, with coils guaranteed against burn-out for life of valve, fit any plug-in Speed King. Coils for ac or dc, any voltage . . . 35 — 200 psi range . . . integral junction box . . . optional manual over-ride, common or separate exhaust ports, sub-base connected external pilot supply . . . 3/4 in. exhaust ports, 1/2 or 3/4 in. inlet and cylinder ports . . . valve meets JIC standards.

Based on the service-proved design principle of the Speed King 1/4 in. plug-in Valvair's 1/2 - 3/4 in. plug-in valve series provides plug-in convenience and versatility to a wider range of control valve applications.

Electrical and pneumatic circuits are completed automatically when valve and pilot are plugged in . . . bolted down. The result — cost-cutting reduction of original installation and maintenance time. All power connections are made permanently in sub-base or manifold . . . there's no need to disturb piping or wiring for quick in-service maintenance.

What's more, advanced design shortens stroke . . . speeds response. Separate coded (4-wire) circuits on double solenoid models meet JIC requirements. Flow area through valve and sub-base equals that of full 1/2 in. pipe.

Whether your control valve applications are on the drawing board or now in service, it'll pay you to investigate the advantages of Valvair plug-in design. A call to your near-by Valvair field office will bring prompt application engineering recommendations.

For more information, write for Bulletin
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Bellows-Valvair

The Bellows Co. • Valvair Corp. Akron 9, Ohio
DIVISIONS OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)

8098-3

August, 1960

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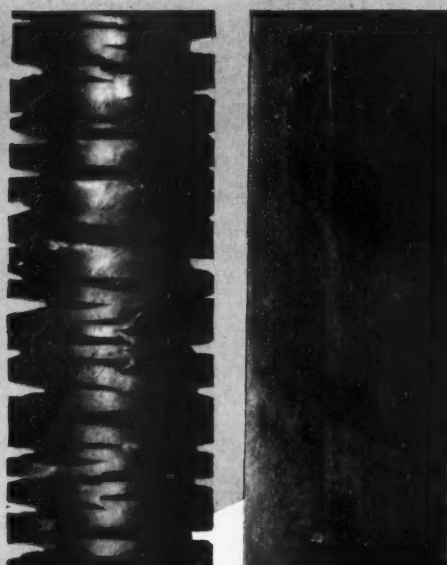
how to vastly increase the useful life of rubber...

Effect of Curing System on Antiozonant Retention in SBR Stocks after Vulcanization

(All contain 3.0 phr UOP 88; 40.0 phr HAF black)

Compound	Accelerator	Sulfur, phr	% Extractable Antiozonant
1082....	2.0 phr benzothiazyl disulfide	2.0	66.4
1083....	1.0 phr benzothiazyl disulfide	2.0	79.6
1087....	None	2.0	~ 100.0
1088....	1.0 phr benzothiazyl disulfide	3.0	74.6
1083....	1.0 phr benzothiazyl disulfide	2.0	79.6
1089....	1.0 phr benzothiazyl disulfide	1.0	88.6
1083....	1.0 phr benzothiazyl disulfide	2.0	79.6
1084....	1.0 phr N-cyclohexyl-2-benzothiazole sulfenamide	—	—
1093....	1.0 phr diphenylguanidine	2.0	~ 18.0
1085....	2.0 phr tetramethylthiuram disulfide	—	35.0
1090....	4.0 phr tetramethylthiuram disulfide	—	12.9

The SBR specimens below were exposed to ozone at 100°F with 20 percent elongation for 52 hr. at 33 ppm ozone, then 167 hr. at 63 ppm ozone.



Carbon black—HAF (high abrasion furnace), Curing system—4 phr tetramethylthiuram disulfide; Hours to first crack—7 to 23.

Carbon black—HAF (high abrasion furnace), Curing system—2 phr sulfur, 1 phr N-cyclohexyl-2-benzothiazole sulfenamide. No cracks in 239 hr.

CONSIDER THE EFFECT OF YOUR CURING SYSTEM ON THE EFFECTIVENESS OF A CHEMICAL ANTIOZONANT

In compounding rubber, there are several things which are important in assuring maximum crack-free life. First, you must use a potent antiozonant like UOP 88 or 288. Next, consider what a vast difference in effectiveness can be realized by your *curing system*.

The right antiozonant used in correct proportion is of primary importance. Then, by using the proper accelerator, you can promote its maximum effectiveness, and thus contribute to maximum ozone protection.

Look at the two rubber test strips illustrated. Both

were formulated with UOP 88 . . . but note how much more effectively the antiozonant worked when accompanied by this change in curing systems—a vast increase in resistance to cracking. The table above the test strips shows how the *proper* accelerator aids antiozonant effectiveness.

Help in achieving maximum effectiveness from UOP 88 or 288 antiozonants in your rubber formulations is available through UOP facilities and technical personnel. Just write or telephone our Products Department.

WHERE RESEARCH TODAY MEANS PROGRESS TOMORROW



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UOP ozone cabinets provide test conditions at a wide range of ozone concentrations.

for
URETHANES
the backbone
of
the activator
is
DABCO®
...the
superior catalyst
that minimizes
flex-fatigue

DABCO . . . High-activity catalyst for stable foams

- **FLEXIBLE FOAMS.** DABCO used as the "backbone" of your activator, in the range of .2-.3 parts per 100 parts polyol assures good retention of RMA properties.
- **CLOSED MOLDING.** Foam molders depend on DABCO for fast cures and good physical properties. Molds can be stripped in minimum time, resulting in a shorter cycle . . . a positive saving in mold cost.
- **RIGID INSULATION.** Unhindered bi-cyclic DABCO completely catalyzes reaction of the components used in rigid formulations. This results in good retention of chlorofluorohydrocarbon, assuring low K factors.

- **PLANT SAFETY.** Unlike some amine catalysts, DABCO has not presented eye injury problems in commercial use.

Complete technical information and prices will be sent promptly on request.

DABCO—Houdry Process Corporation Trademark for triethylenediamene $C_6H_{12}N_2$.



HOUDRY

PROCESS CORPORATION

1528 Walnut Street, Phila. 2, Pa.

**Houdry means Progress...through Catalysis*

Delayed action activation for Hevea and SBR compounds

ETHYLAC®, an excellent nonstaining, nondiscoloring primary accelerator, can also improve the processing characteristics and ultimate physical properties of Hevea and SBR compounds containing other accelerators. Small additions of ETHYLAC provide delayed action activation for Hevea compounds cured with thiazole-type accelerators, and for SBR compounds cured with either thiazoles or sulfenamides.

The data below summarize the results with ETHYLAC and MBTS. More detailed data on ETHYLAC activation with other thiazole and sulfenamide-type accelerators are given in Bulletins S-130 and S-141, available on request. Ask your Pennsalt representative or write Industrial Chemicals Division, PENNSALT CHEMICALS CORPORATION, Three Penn Center, Philadelphia 2, Pa.



MBTS Activated with ETHYLAC

MBTS ETHYLAC	Hevea-HAF Black Tread Stock				SBR 1500-HAF Black Tread Stock			
	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	—	0.4	—	—	—	0.5	—	—
Mooney Scorch								
T-5 @ 266°F.	10.3	10.6	25.0	23.8	10.3	10.6	25.0	23.8
Cure, min. @	284°F.				284°F.			
	M300	T	E	H	M300	T	E	H
20	1725	3825	600	65	2625	3450	410	74
30	2025	3825	530	68	2900	3425	380	75
40	2100	3975	530	66	3100	3400	350	73
80	—	—	—	—	—	—	—	—
Cure, min. @	302°F.				302°F.			
	M300	T	E	H	M300	T	E	H
20	325	950	760	51	1025	2675	610	57
30	575	1825	725	52	1700	2950	430	61
40	825	2575	675	53	1975	3025	400	64
80	1625	3400	550	60	2475	2875	310	67



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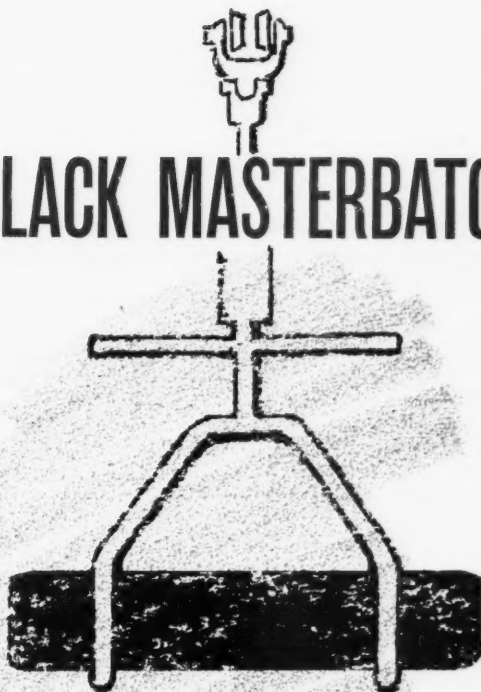
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new products

(Continued from page 32)

and suffers no deterioration from the moderate heat found in most industrial environments. The material, is, moreover, impervious to oil, and most common commercial solvents cannot affect it, adds U. S. Rubber.

The working range of temperatures for Uscothane products is from -30° F. or lower to 250° F. in normal service. In wet service, the upper range is 160° F.

Some Uscothane products already are in use as part of the rubber company's exhaustive testing program, being carried on in cooperation with many manufacturers. Some other Uscothane products widely tested include chute linings and pipeline crawler wheels as well as scrapers in various grinding machines.



This giant tire is made by The Firestone Tire & Rubber Co., Akron, O., for use on giant equipment employed on soft terrain or in the Arctic. The tubeless tire, more than 10 feet high and four feet wide, will be inflated in operation with less than 10 pounds of air pressure per square inch, about one-third the requirement for a passenger-car tire. The low-pressure design gives exceptional flotation characteristics, it is further claimed by this tire manufacturer

Carthane 1003, 1008 Rigid Foams

Two new rigid high-temperature-resistant urethane foams have been developed by The Carwin Co., North Haven, Conn. The two foams, designated Carthane 1008 Infusible Foam System and Carthane 1003 Infusible Slow Foam, retain from 45 to 65% of their room-temperature compressive strength at 600° F. and cannot be melted or fused at any temperature, it is claimed.

Exposed to increasingly higher temperatures, the cellular structure is maintained, and the foams only slowly begin to carbonize at about 900 to 1000° F.

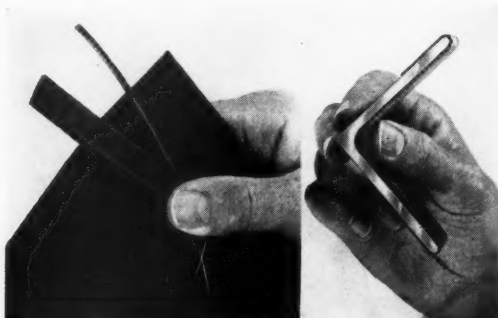
They then proceed to pass directly from the solid to gaseous state.

Carthane 1008 system is rapid reacting and produces rigid foams that have mechanical strength in frigid to intensely hot environments. Coefficient of thermal conductivity (K-factor) of 3-lb./cu.ft. foam at 325° F. is only 0.26. Identical properties are found in Carthane 1003 which, however, has a controllable pot life of 5 to 12 minutes, permitting the material to flow into voids of complicated shapes before reaction commences.

Density available in the Carthane foam series ranges from 3 to 40 lb./cu.ft. The foams, supplied as two- and three-part packages, are available in a range of sizes.

Key to the high-temperature performance of the new foams was Carwin's development of a new isocyanate, polymethylene polyphenylisocyanate. This chemical, trade marked PAPI, is a mixture of low molecular weight polymers and has the average composition of the trimer.

Technical data sheets, CPP No. 14, covering Carthane 1008, and CPP No. 13, covering Carthane 1003, are available upon request from the Carwin company.



Penton is available in extruded sheet form, welding seam strips, and welding rod (picture, left). The picture on the right shows a possible use of the material as a contour lining

Penton Sheets for Lining Vessels

Penton, a chlorinated polyether compound, is now marketed in sheet stock specifically for vessel lining applications, by United States Gasket Co., plastics division of Garlock, Inc., Camden, N. J. The thermoplastic material is supplied in extruded sheet form 0.040-inch thick by 21 inches wide and also in welding seam strips and welding rods. It can be welded in a manner similar to poly(vinyl chloride) and is seamed with a heat gun.

The material is reported to be resistant to corrosives, bleaching agents, solvents, and plating solutions, not subject to thermal shock, and serviceable up to 280° F. It can line vessels of unlimited size and can be applied to virtually any contoured surface.



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Maximum Benefit**

The problems eliminated by this unique reel-less core packaging system are manifold. Loads are palletized two cores per pallet and may be stacked two or three high. This, plus the fact that

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This is typical of Roebling's advanced packaging methods—that makes handling Roebling high-quality wire so

much easier. For details on this efficient Roebling Tire Bead Wire packaging method, or information on other types of Roebling wire, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

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HALLCO NEWS

Issued by
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Chemical Manufacturers

**HALLCO C-566
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BOTH NATURAL
AND SYNTHETIC
RUBBERS**

As a plasticizing agent, Hallco C-566 is highly recommended for use in the processing of all types of natural, synthetic or reclaimed rubber. It is a superior break-down ingredient and aids in the dispersion of carbon black and other additives. This Hallco plasticizer will help obtain smoother tubing, finer extrusions and calendering. Used in amounts ranging from 1 to 10 parts it also tends to reduce scorch to a minimum. Hallco C-566 is a clear, oily, amber liquid of petroleum origin. This plasticizer is manufactured by The C. P. Hall Company and is available in drums or tank cars.

**HALLCO C-311
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AND PLASTICS**

This ester type plasticizer is a primary softener for nitro and ethyl cellulose, chlorinated rubber, polystyrene and various other synthetic rubbers. Hallco C-311 also functions as a secondary plasticizer for vinyl resins. Since it is of fatty nature, films containing it should be inhibited to prevent growth of mildew type fungi. When used as a wetting agent for colors and pigments it is helpful in formulation of special inks. Other uses of Hallco C-311 are found in the low temperature processing of Perbunam and Paracril type rubbers. In addition to producing rubber compounds that pass the ASTM Low Temperature Brittleness Test at minus 60° C, it also gives higher tensile strength and improved elongations. Hallco C-311 is also manufactured by The C. P. Hall Company and is available in drums or tank cars.



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Samples and data on Hallco C-566 and Hallco C-311 are available on request. Order yours today!

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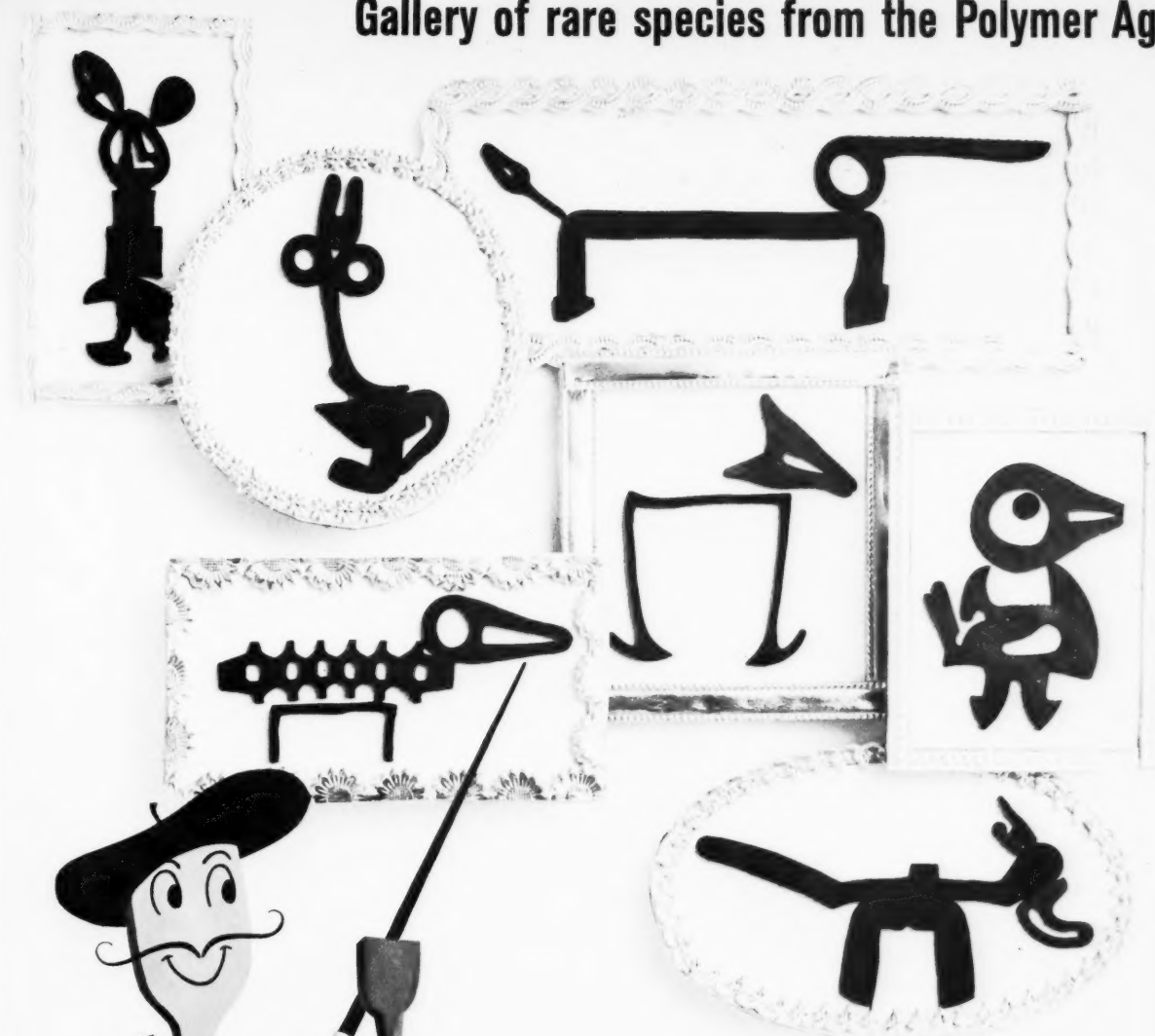
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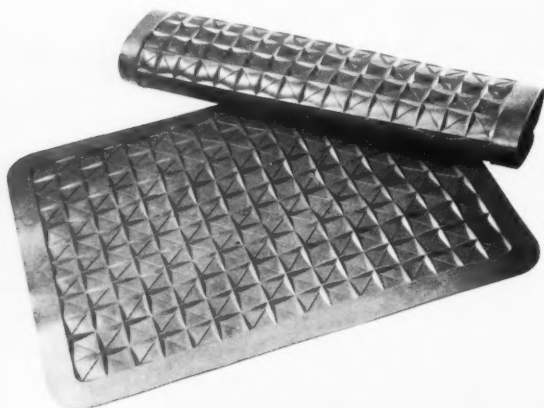


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technical books

NEW PUBLICATIONS

"Philprene Polymers." Phillips Chemical Co., rubber chemicals division, Akron, O. 52 pages. This bulletin supplies compound information and technical data on Philprene SBR's in clear tabular form, in addition to recommendations for probable end uses. Included are brief descriptions of the rubbers, indicating whether they are hot or cold, polymerized regular or oil-extended, unpigmented or pigmented, as well as specifications for uncompounded rubber and for compounded test stocks, and recipes with their typical properties.

"Ozone Resistance of Polysulfide Crude Stocks." Bulletin CS-2. Thiokol Chemical Corp., Trenton, N. J. 8 pages. Information is given on the effect of various antioxidants on the ozone resistance of Thiokol FA, Thiokol ST, and Thiokol ZR-300, with emphasis on the effect of NBC. Other antioxidants used were p-phenylenediamine compounds and cresol. Included are two graphs and three tables.

"Zeolex 23." By R. O. Treat, W. E. Kavenagh, C. A. Carlton. J. M. Huber Corp., New York, N. Y. 42 pages. This bulletin replaces the former Zeolex 23 data, pages RC-12 through RC-21, in the Huber Rubber Products Manual. The bulletin describes the heat generation of compounds utilizing the product, a reinforcing silicate pigment, with other silica and silicate pigments; mixing procedures and dispersion of pigments; and compound recipes for various types of footwear, treads, tubing, and a variety of other applications.

Publications of Nalco Chemical Co., Chicago, Ill.:

"Cooling Water Inhibitor Performance: Film Formation vs. Film Maintenance." Reprint No. 92. By P. R. Puckorius and W. J. Ryzner. 8 pages.

"Water Treatment for Poly-Metallic Cooling Systems." Reprint No. 91. By E. H. Hurst. 10 pages.

"Selection of Treatment for Cooling Waters." Reprint No. 88. By E. H. Hurst. 6 pages.

"The Nalco 82 Method for Treatment of Recirculating Cooling Water and Process Water Systems." Process Bulletin C2. 4 pages.

"Rapistan Live Roller Adjustable Pressure Conveyor." Rapids-Standard Co., Grand Rapids, Mich. 4 pages. This bulletin describes principles of adjustable pressure operation and its application to temporary accumulation with minimum line pressure.

"Electric Ovens." Bulletin 71-TH. Trent, Inc., Philadelphia, Pa. 12 pages. This bulletin covers the Trent line of industrial high-temperature, recirculating, gravity and forced convection ovens, plus suggestions for applications of the different types. Also included is a description of ovens designed for special industrial uses.

"Use of Monex and Tuex." Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn. 2 pages. This folder describes the use of Monex (tetramethyl thiuram monosulfide) as an ultra-accelerator alone or in combination with thiazole-type accelerators, in natural, SBR, nitrile, butyl, neoprene W, and reclaimed rubbers in insulated wire compounds, molded sundries, mechanicals, cold SBR tire tread and camelback compounds, natural and SBR air-cured compounds, sponge, sulfur vulcanization of Neoprene W and nitrile. Also covered is the use of Tuex (tetramethyl thiuram disulfide) as a primary accelerator or secondary accelerator in natural and SBR rubbers, as a vulcanizing agent in superaging natural, SBR, and nitrile compounds, as a primary accelerator in butyl and in natural rubber sponge compound, and as a secondary accelerator in natural rubber steam hose tube, SBR-resin oak sole, and calendered SBR air-cured sheeting.

"Schenectady Resins for Rubber Compounding and Rubber-Based Adhesives." No. S-79. Schenectady Varnish Co., Inc., Schenectady, N. Y. 16 pages. This new publication presents the latest data on the properties and functions of the resins produced by the company for use in compounding rubber and in formulating rubber-based adhesives. Presented is a discussion of use of the major types of phenolics, including thermosetting, novolac, heat-reactive alkyl and non-heat-reactive alkyl, terpene-phenol resins, and pure hydrocarbon polyterpenes, with butyl, natural, nitrile, reclaimed and SBR elastomers. A two-page summary of properties and uses of Schenectady resins, in tabular form, is given.

"Compounding with Silastic (Silicone Rubber) Gums and Bases." 1960 Edition. Dow Corning Corp., Midland, Mich. 36 pages. Articles appear on advantages and problems of compounding, Silastic compounding materials, fillers for silicone rubber, two-filler combinations, filler-base and filler-gum combinations, shelf-aging of unvulcanized compounds, vulcanizing agents, additives, and equipment and procedures. Included are graphs and charts plus a series of nomographs for rapid computation of two-filler formulations for desired properties and cost.

"Air Conveying Systems." Flo-Tronics, Inc., Dept. K-P2., Minneapolis, Minn.



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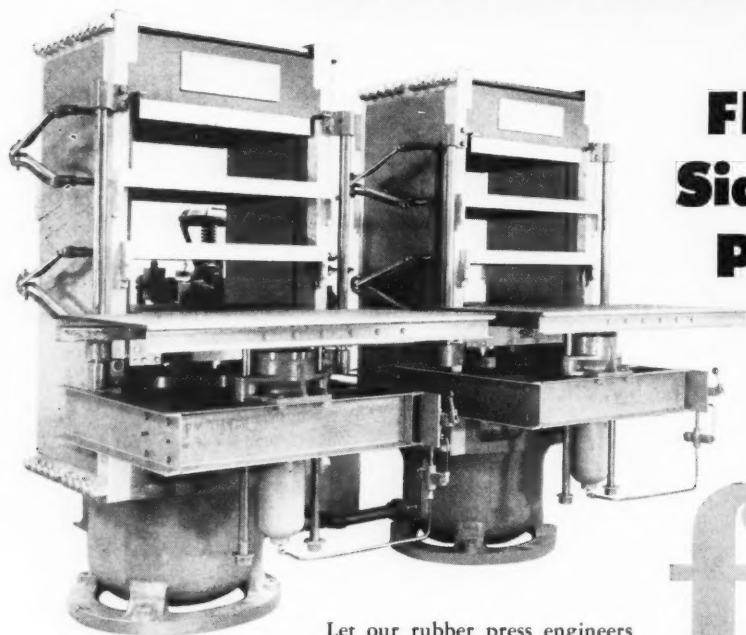
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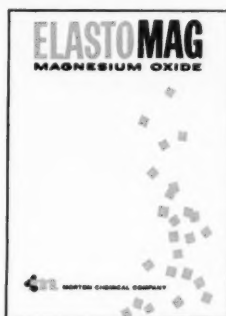
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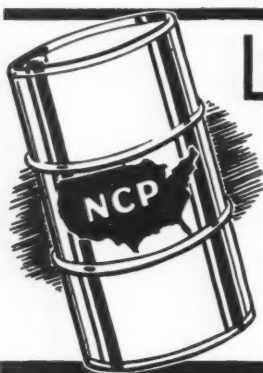
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new materials

Extender for Polystyrene Compounds

Godfrey L. Cabot, Inc., Boston, Mass., is marketing Wollastonite, an extender pigment which it claims, can be used in polystyrene compounds at concentrations of 20 to 30% by weight without degrading tensile or flex strength. Wollastonite is a mineral form of calcium silicate.

The manufacturer says that savings in the raw material cost of finished polystyrene compounds can be realized by use of the extender at the concentrations tested, and that essentially no additional processing or processing expense is necessary for the incorporation of Wollastonite into the product.

Wollastonite has a specific gravity of 2.9, compared to 1.05 for polystyrene, and manufacturer claims that the added product density with Wollastonite loadings can be useful where added weight is needed in a product.

% Wollastonite	0	10	20	30
Tensile, psi.	8344	8585	8621	8138
Elongation, %	2.30	3.20	3.30	2.70
Izod impact strength, ft.	0.39	0.35	0.37	0.28
Density, lbs.	65.5	69.9	75.2	81.0
Flexural test, lbs.	56.3	62	*	61.1

*No specimen available.

Cabot's registered trade mark for this material is Cab-o-lite.

Three New Ameripol Polymers

Three new Ameripol polymers, including a light-colored cold SBR polymer, a micro-black masterbatch cold SBR polymer, and a low viscosity SBR, have been announced by Goodrich-Gulf Chemicals, Inc., Cleveland, O.

Ameripol 4600 is a light-colored, non-staining, fatty acid emulsified, cold SBR polymer, with a reduced Mooney viscosity of approximately 8 points, compared to its hot counterpart Ameripol 1006 or the cold, non-staining Ameripol 1502. The easier processing and faster breakdown, combined with light color and other physical properties, make 4600 suitable for soling, white sidewalls, colored mats, flooring, and white and light-colored mechanical goods, Goodrich-Gulf reports.

Ameripol 1805 is a non-staining, fatty acid emulsified, cold SBR copolymer extended with 37½ parts of naphthenic oil and intimately dispersed with 75 parts of HAF black. High dispersion of the carbon black is obtained by high liquid shear agitation of

(Continued on page 56)

Now! another cost-cutting
fmc development



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NEOPRENE GRADE MAGNESIA!

Newest addition to FMC's widely diversified line of magnesiases . . . gives neoprene and synthetic rubber compounders these advantages:

High bulk density!

To work into the batch more readily.

Finer particle size!

To provide better dispersion and distribution throughout the batch.

High adsorptive capacity!

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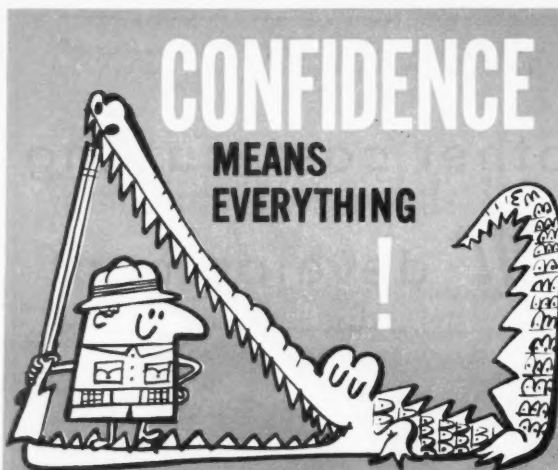


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new materials

(Continued from page 54)

the oil, latex, and carbon black and immediate coagulation of the blend. Goodrich-Gulf reports easy processing and cost advantage of the masterbatch make 1805 suitable for molded, extruded, and mechanical goods applications where non-staining is required.

Ameripol 4601 is a low Mooney cold SBR stabilized with a non-staining and non-discoloring antioxidant. Preparation using a mixed soap of rosin acid and fatty acid and coagulated with alum results in a polymer suitable for low water applications. The Mooney viscosity is in the range of 30 to 38, and the product's light color, low viscosity, and low water absorption make it of interest for extrusions, soiling and heels, tile, mats, and closed- or open-cell sponge, the manufacturer adds.

Some chemical and physical properties of the three new polymers follow.

	Ameri- pol 4600	Ameri- pol 1805	Ameri- pol 4601
Volatile matter, %	0.75	0.75	0.50
Ash, %	1.50	1.59	0.57
Acid, %	7.30	4.25	5.83
Soap, %	0.50	0.50	0.01
Stabilizer, %	1.75	1.75	—
Bound styrene, %	24.50	24.50	22.90
Mooney viscosity, ML-4 @ 212° F.			
Raw polymer	41	—	34
Compounded	56	53	50
Tensile strength, psi. (50')	3660	2990	3380
Elongation, % (50 cure @ 292° F.)	710	480	530
Modulus at 300% elongation, psi.			
25 cure @ 292° F.	440	1410	530
50 cure @ 292° F.	880	1890	960
100 cure @ 292° F.	1405	2310	1260

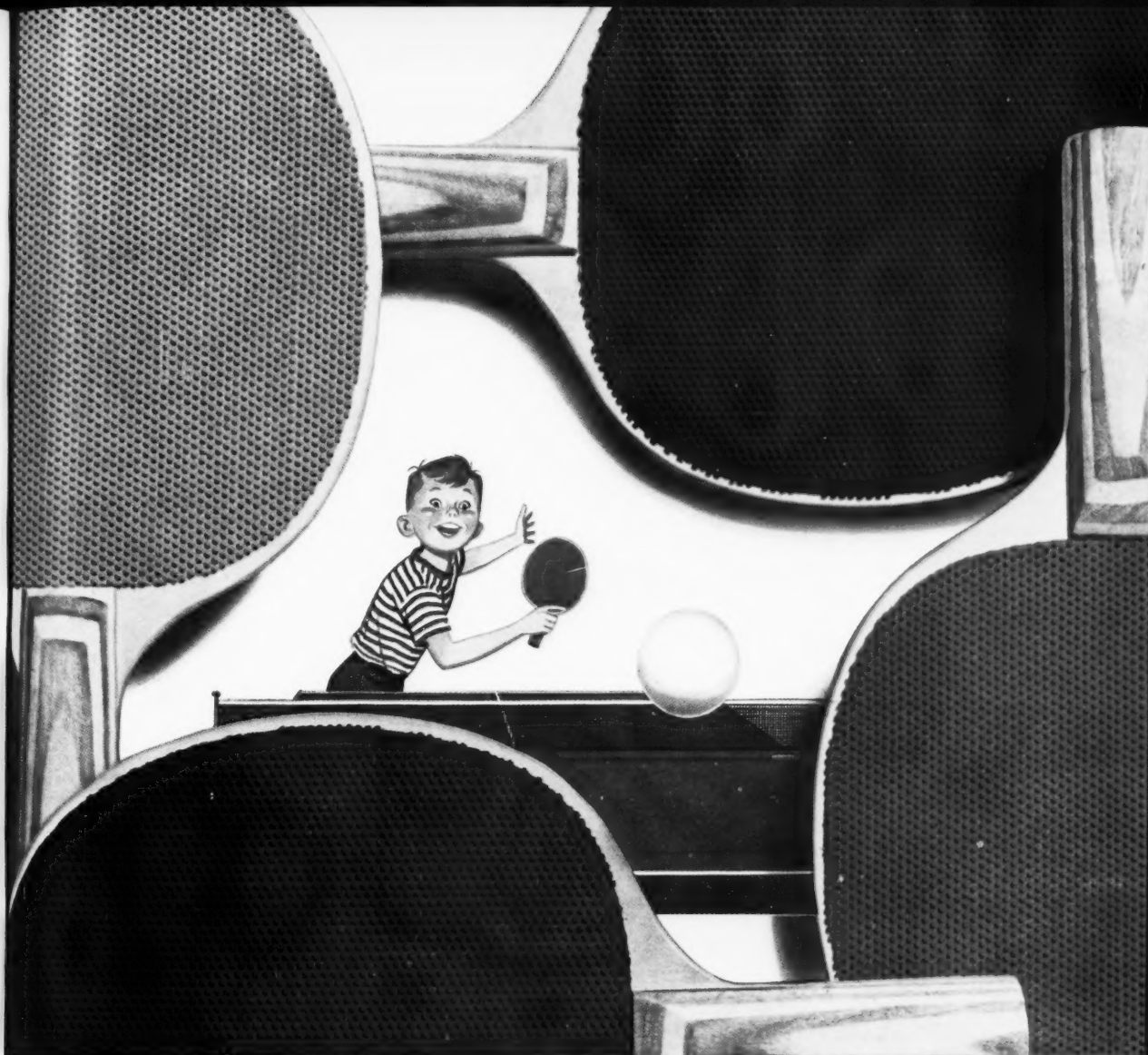
Technical data sheets No. 126 (Ameripol 4600), 127 (Ameripol 1805) and 128 (Ameripol 4601), giving more detailed information and the test recipe, may be obtained from Goodrich-Gulf.

New Knurled Inserts

A new line of knurled and serrated (KXS) inserts has been introduced by J. B. Plevyak Mfg. Co., Newton, N. J. The manufacturer reports that the inserts have one design suitable for cold materials, hot materials, or molding, with special anchoring qualities against rotation and pull out. The inserts, available in brass, aluminum, and mild steel, are smaller in overall dimensions than standard SPI inserts, permitting insertion where dimensions are limited, the manufacturer says.



"Sun Prestige 740-A EP Lubricant." Sun Oil Co., industrial products department, Philadelphia, Pa. 1 page.



How Ameripol Rubber puts "English" on the ball

It takes a special rubber material to keep up with the table tennis trade. Those hundreds of tiny rubber nubbins on the paddle enable the player to put plenty of spin or "English" on the ball.

The manufacturer of this material, The Hodgman Rubber Company, turned to Ameripol Rubber to meet his unusual requirements. Since Ameripol 1013 is highly plastic in the processing stage, it proved to have ideal flow characteristics . . . thus a perfect molded pattern and strong bonding to the fabric backing was achieved. And with this light polymer, the material can be made in a variety of gay colors.

When you want to put something extra on the ball, check with Goodrich-Gulf. We produce the broadest range of rubber polymers in the industry, offer thorough technical service to match man-made rubber to your needs. For information contact Goodrich-Gulf Chemicals, Inc., 1717 East Ninth Street, Cleveland 14, Ohio.



Goodrich-Gulf Chemicals, Inc.

THE ONE TO WATCH FOR NEW DEVELOPMENTS

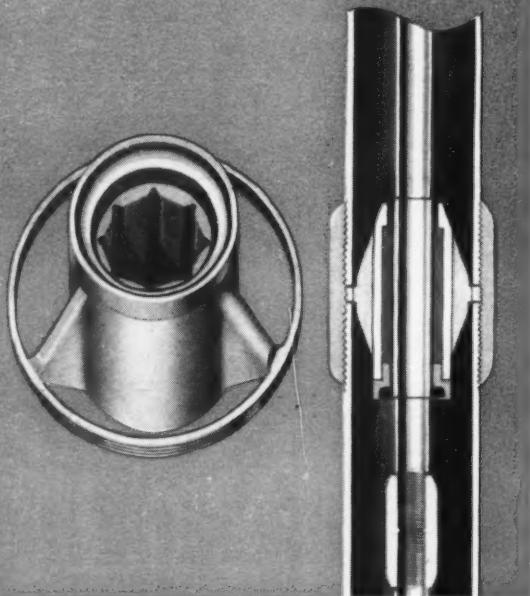
NEWS FROM GOODRICH-GULF

RUBBER BEARINGS KEEP PUMP SHAFT RUNNING SMOOTH

Ameripol Rubber is used for the special Cutless Bearings which support deep-well shafts on several types of pumps for use in wells, tanks, sumps or reservoirs, made by The Deming Company of Salem, Ohio. The bearings are available from Lucian Q. Moffitt, Inc., Engineers and National Distributors, 333 South Main Street, Akron, Ohio.

The Ameripol polymer used is tough, and is not affected by sludges or waste chemicals often found in water. The Cutless Bearing is fluted, thus sand or grit present in the fluid being pumped is quickly washed away. With conventional metal bearings, abrasive solids cut and score the bearing, leading to a loose fit and vibration.

This type of water-lubricated rubber bearing is particularly applicable on industrial equipment where bearings are submerged, as well as propeller shafts of boats.



NEW MARKET FOR RUBBER IN THE COMPACTS

The automotive industry's success in "selling small" has meant a big new market for Styrene-Butadiene Rubber. This compact car, for example, carries approximately 48 pounds of SBR parts.

Largest uses by weight are the tires. Other SBR applications include battery, steering linkage and covers, clutch and brake pedals, engine mounts, and a wide assortment of grommets, bushings, and seals throughout the vehicle.

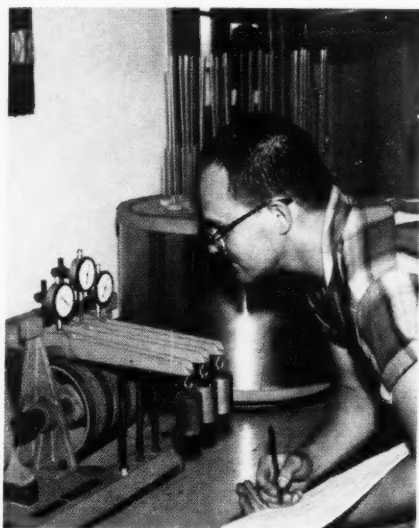
While many parts are SBR, the requirements naturally vary, and many different polymers are used. As the world's largest source of synthetic rubber, with the broadest range of polymers, Goodrich-Gulf is in unique position to help rubber product fabricators supply this new market.



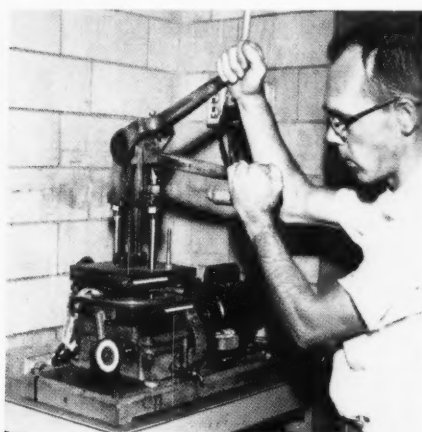
RUBBER GETS A "COMPLETE PHYSICAL CHECKUP" AT GOODRICH-GULF SALES SERVICE LABORATORY

These scenes are representative of dozens of special tests conducted at the G-G Sales Service Laboratory for the benefit of our customers. Here polymers are checked in different compounds to measure the properties needed in individual applications. Problems are

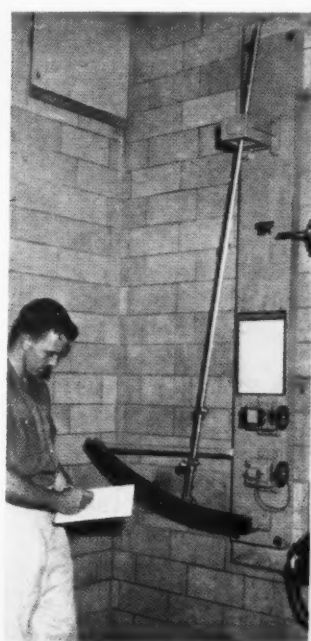
thoroughly analyzed so that sound technical recommendations can be made. Evaluations and special tests on polymers you use are available to you through Goodrich-Gulf Technical Service.



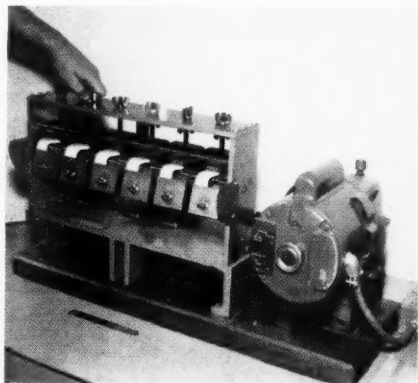
Sandpaper rubs rubber raw to check resistance to abrasion.



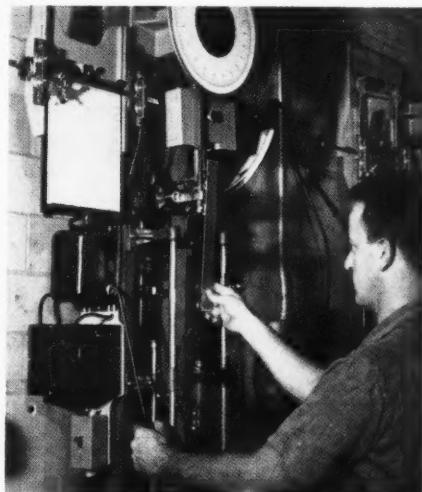
Ease of flow and processing determined by Mooney viscosity test.



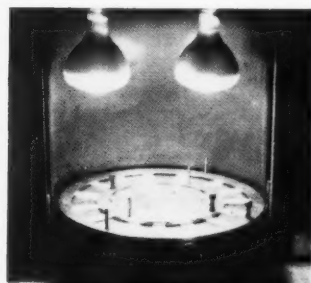
Rebound of the swinging hammer gives measure of resilience.



Specimens are flexed hour after hour until failure.



Test strips torn apart to measure strength and elongation.



Effects of sunlight on color evaluated by ultraviolet tests.

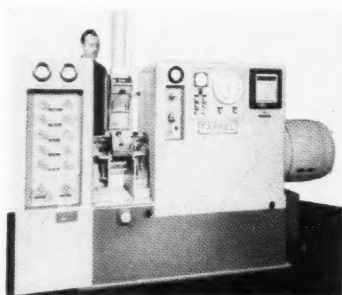


Goodrich-Gulf Chemicals, Inc.

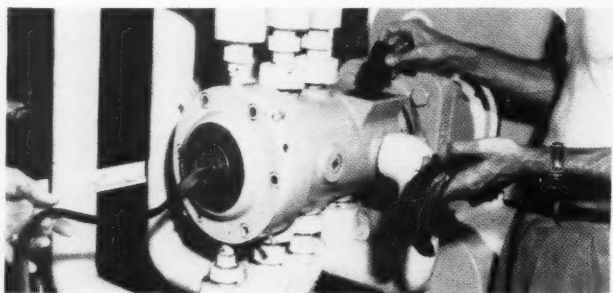
1717 East Ninth Street • Cleveland 14, Ohio

PROCESSIBILITY IS A PRIME OBJECTIVE AT GOODRICH-GULF LABORATORY

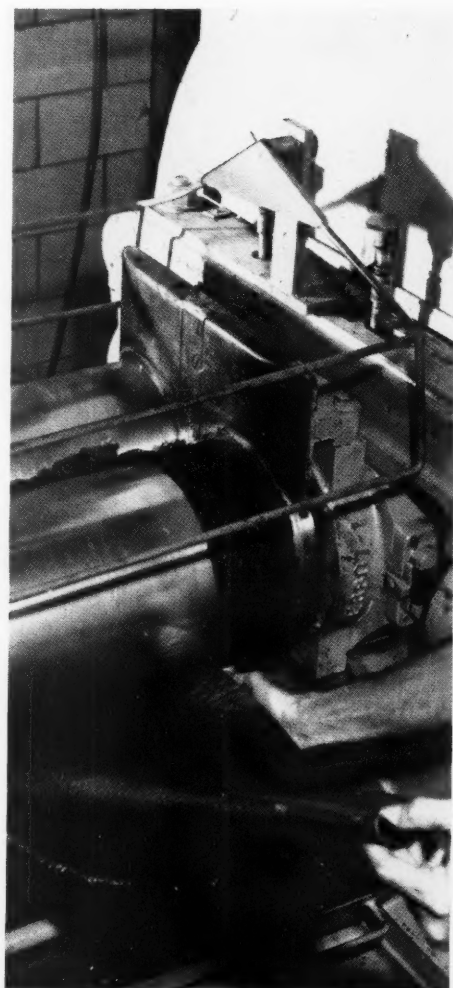
Easier processing SBR saves you time and money — can often eliminate complete operations in your plant. Thus the Goodrich-Gulf Sales Service Laboratory utilizes processing equipment to help in the development and improvement of these polymers. Ask your Goodrich-Gulf representative for full information on the newer types of low-Mooney Ameripol SBR.



Banbury[®] Mixer indicates expected results in factory operations.



Variable speed extruder tests smoothness, rate of extrusion, processibility.



This mill is one of several units which help check breakdown characteristics.



Goodrich-Gulf Chemicals, Inc.

1717 East Ninth Street • Cleveland 14, Ohio

T

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SOUND ENGINEERING

...THROUGHOUT THE WORLD



Since 1940, a total of 74 predip and calendar lines for rayon and nylon tire cord fabric production have been designed and built by C. A. Litzler engineers for leading tire manufacturers throughout the world. In addition to these prime production installations located in 32 countries around the globe, 22 Computreaters — precision laboratory impregnation lines introduced in 1957—have been built for worldwide customers.

All of these production units are in profitable operation today, and a substantial number of them represent repeat orders based on outstanding performance of an initial unit or line.

Designed for clean, highly accurate and rugged performance, these Litzler units qualify, by actual report of the operating engineers, as requiring the lowest maintenance in the industry.

C. A. LITZLER CO., INC.

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EXPORT REPRESENTATIVE: GILLESPIE & CO. OF N. Y., 96 WALL ST., NEW YORK 5, N. Y.

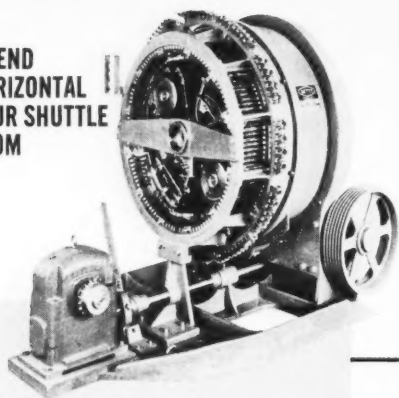
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Paris, France

Mather & Platt, Ltd.
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FOUR SHUTTLE
LOOM

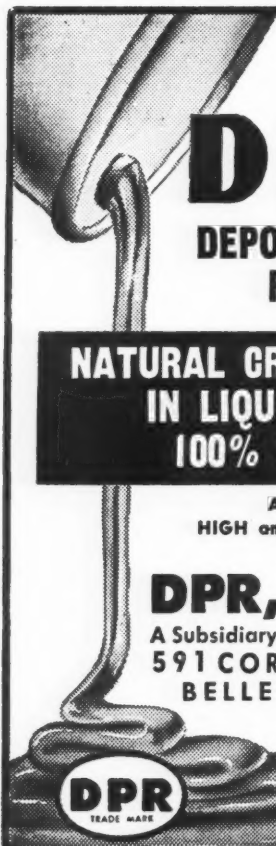


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Circular Looms
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DPR
TRADE MARK

new equipment

New Models of "Budgit" Air Hoists



New model "Budgit"
air hoist

Shaw-Box crane and hoist division, Manning, Maxwell & Moore, Inc., Muskegon, Mich., has expanded its line of "Budgit" air hoists to include new models with integral push-type trolley suspensions, along with present hook-type suspension models. Each is available in 1/4-, 1/2-, and one-ton capacity sizes, with standard 10-foot lifts.

"Budgit" air hoists are designed especially for production lifting jobs, including use in atmospheres of high ambient temperatures or which have explosive vapors or

dust in them. These hoists can be used under heavy-duty cycle operations because their motors will not burn out since overloads merely slow or stall them, it is further claimed.

The new models have push-type trolleys mounted directly on the hoist frames in place of upper suspension hooks. Construction features include an aluminum alloy frame, vane-type air motor, built-in muffler, shoe-type load brake, safety-type forged steel load hook, one-hand pendant control cord, and upper and lower limit stops.

Additional information and a bulletin, No. 15010-24A-58, are obtainable from the manufacturer.

New Viscosity-Temperature Two-Pen Recorder for Mooney Viscometer

Scott Testers, Inc., Providence, R. I., is now offering, in addition to the standard single-pen type of electronic strip chart recorder, for direct reading of viscosity, a new two-pen type of recorder. Both types are for use with their firm's Model NBS and Model STI Mooney shearing disk viscometers.

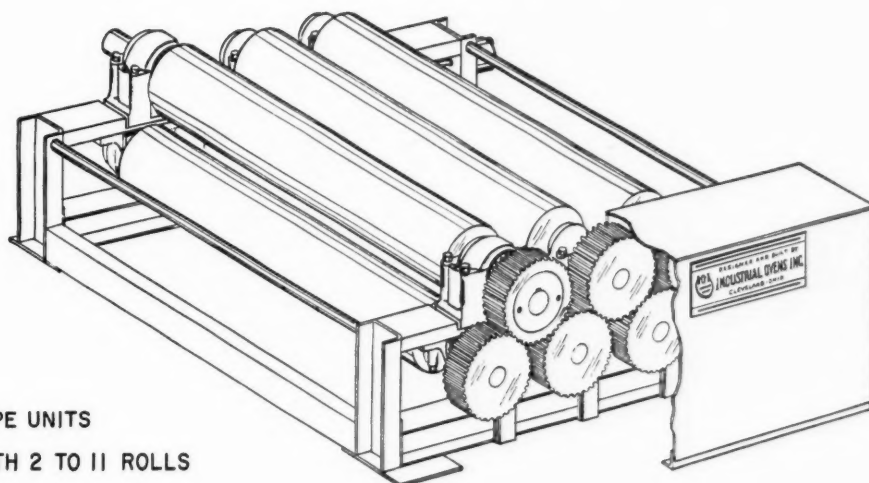
The new recorder provides simultaneously on the same strip chart a direct reading of viscosity in Mooney units and a record of the actual temperature within the test specimen itself.

Both types of recorders have a strip chart with



TIRE FABRIC PROCESSING EQUIPMENT

PULL ROLLS



CAPSTAN TYPE UNITS

DESIGNED WITH 2 TO 11 ROLLS

CAPABLE OF EXERTING TENSIONS

UP TO 30,000*

DESIGNED FOR MAXIMUM DEFLECTION OF .010"

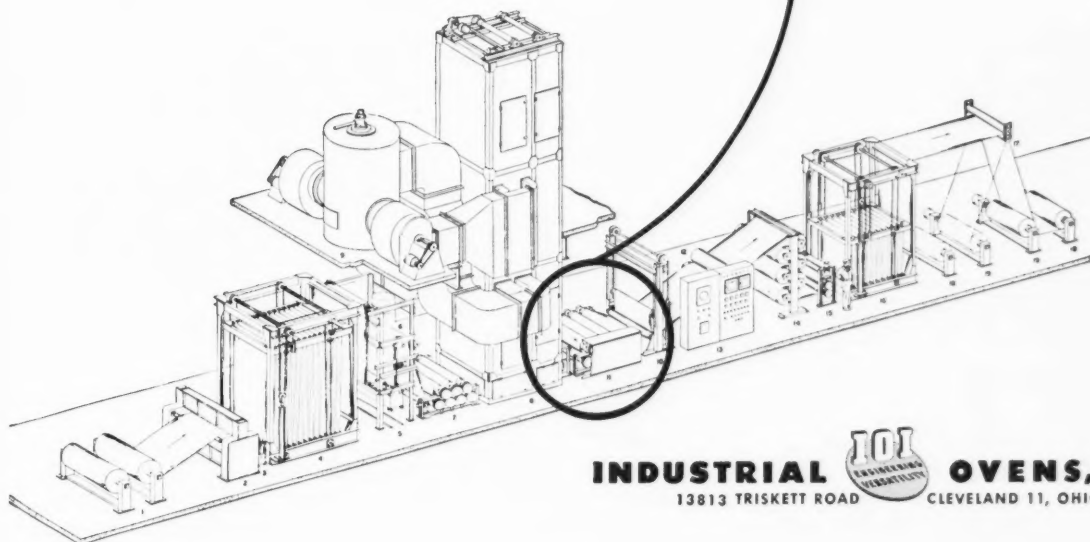
SUITABLE FOR WET OR DRY MATERIAL

ROLLS OF DIFFERENT MATERIALS AND FINISHES

MADE TO SUIT YOUR REQUIREMENTS

MANY SATISFIED CUSTOMERS
CAN CONFIRM THE RUGGEDNESS
& DURABILITY OF OUR PULL ROLLS
UNDER CONTINUOUS SERVICE.

INQUIRIES INVITED



INDUSTRIAL OVENS, INC.

13813 TRISKETT ROAD



CLEVELAND 11, OHIO

new equipment



PICKUP
DEVICE
ENLARGED
TO SHOW
DETAIL

Scott's new dual-pen
strip chart recorder
for Mooney viscometer



ten graduations to the inch of the time scale to facilitate accurate time readings at any chart speed,

and both can be equipped with controls for safe, unattended operation and complete authoritative test reading.

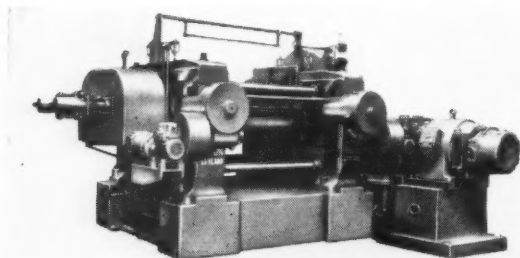
New Needle Thermistor Prober

Atkins Technical, Inc., Cleveland, O., has announced a line of retractable, thru-surface probe tips for taking temperature readings at depths of non-rigid materials such as rubber and plastics. The sensitive needle tip of the probe is protected within a sheath when not in use. When temperature readings are desired, the user turns a dial selector on the probe. This action permits insertion of the tip into the non-rigid mass. On the withdrawing of the needle the combination adjustable stop and needle sheath protects the user and the needle against damage.

The measuring probes are watertight and abrasionproof and are designed for use with Atkins A Thermophil instruments covering —150 to 450° F. temperature with multiple scales. Using thermally sensitive resistors, or "thermistors," these instruments maintain their electrical characteristics for years—without significant drift, reports the company. These instruments are extremely sensitive and have both low heat capacity and fast response.

Model No. 4412 instrument measures on three scales temperatures between 32 and 410° F. Readings are made within one-quarter of a degree and accuracy is within 0.2% of the total 390° range for

A well matched pair



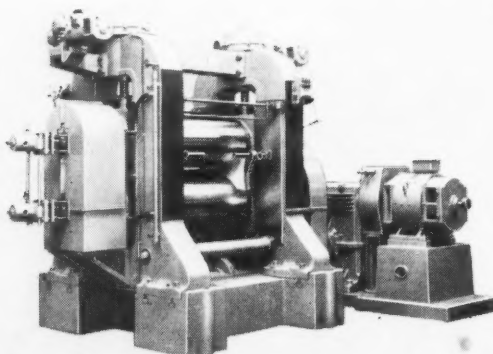
B.Z.10. Horizontal 2-Roll Calender motor driven through worm reduction gear. Design includes motorised roll adjustment, water cooled bearings, high pressure glands and front roll scraper. Rolls 24 in. diameter.

C.E.5. Heavy duty 2-roll Calender with water cooled bearings and individually motor driven adjusting gear. Roll 24 in. diameter.

To give quantity production to match the quality of the finished sheet, IDDON'S have produced this combination.

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Piccopale

the versatile petroleum resin

Easy to use Piccopale is a neutral, low cost petroleum hydrocarbon resin. Completely polymerized, Piccopale is non-reactive and uniform, has wide compatibility, and is soluble in aromatics and low solvency naphthas.

Piccopale offers new approaches and economic advantages to compounders in many fields that demand alkali, acid, and water resistance.

Piccopale is readily available from strategically placed warehouses and in large quantity from its production points in melting points 70°C through 110°C (B & R) in molten, solid, flaked, solution and emulsion form.

Don't forget specific gravity:

Rosin @ 20°C—1.087

Piccopale @ 20°C—0.975



The trademark of quality

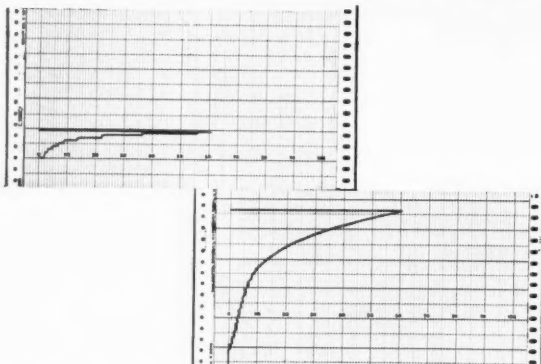
PENNSYLVANIA INDUSTRIAL CHEMICAL CORPORATION
CLAIRTON, PENNSYLVANIA

Distributed to the Rubber Industry by HARWICK STANDARD CHEMICAL CO., Akron 5, Ohio

TEST TIPS

FROM THE SCOTT LABORATORY

RUBBER S-T-R-E-T-C-H TEST



Upper chart shows tensile test, plotted with "pipping" control, on dumbbell-shaped specimen to evaluate stretch and load at desired time interval. Lower chart shows standard tensile test curve for ring-shaped elastomeric specimen. Both tests were made with Scott's Model CRE tester—another good example of Scott testing versatility and convenience through *electronic weighing*!

Write for CRE BROCHURE

SCOTT TESTERS, INC.

90 BLACKSTONE STREET • PROVIDENCE, RHODE ISLAND

SCOTT TESTERS

THE SURE TEST...SCOTT



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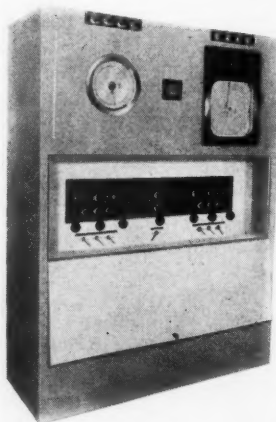
**CHEMDYE RUBBER CORP.
331 MADISON AVENUE
NEW YORK 17, N.Y.
MURRAY HILL 7-3034**

new equipment

the first third of the scale. Accuracy at the extreme point is still within 0.7%. Portable models using standard dry cell batteries, and a.c. powered models are available.

Additional information on these new H20AF retractable probes is also available from Atkins.

W-C Batch-Weighing Systems



Control panel for six-ingredient batch-weighing system

A new bulk-materials batch-weighing system for use in multi-ingredient product formulation has been developed by Weighing & Control Components, Inc., Hatboro, Pa. Capable of a weighing accuracy of 0.25% calibrated range, and of reproducibility better than one part in 2000, the system can be used to batch-weigh two, three, four, or more ingredients—in programmed sequence, in any desired proportions. Once system parameters have been programmed, operation is fully automatic.

Feed and discharge devices, weigh hoppers, and weight transmitters are individual equipment packages; they are unit assemblies which can be interchanged with building-block simplicity, it is said.

Detailed information on the systems is given in Bulletin 30, which is available from the company.

L-S Straddle-Type Footlift Truck

A new special straddle-type hydraulic footlift truck equipped with fixed forks for handling low underclearance pallets and skids has been developed by Lewis-Shepard Products, Inc., Watertown, Mass.

The new truck has a capacity up to 2,000 pounds and can be equipped with forks for 48-inch load lengths. The forks can be used with pallets that are either open-face or double-face style. With 2,000-pound capacity and a 48-inch load length the forks are five inches wide by 36 inches long.

Lewis-Shepard has also developed a new portable-scale truck that incorporates a scale as an integral part of a hydraulic footlift truck, enabling commodities to be moved and weighed simultaneously. The hydraulic footlift handtruck is built with special lifting angles to hold the scale. Each truck must be adapted to suit the design and the capacity of the scale to be used.

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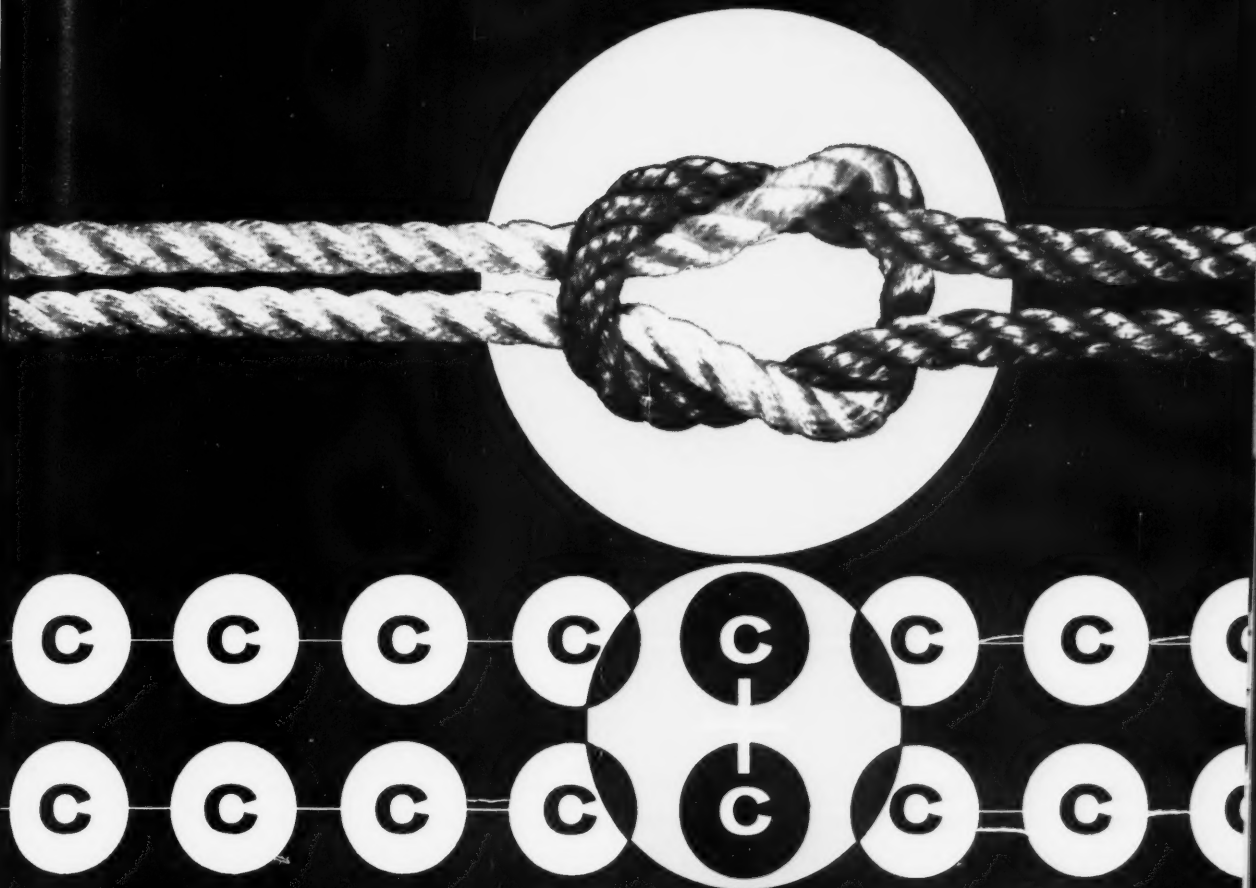
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DI-CUP® . . . *The Chemical Way
to Cross-Link Polyethylene*

Di-cup, Hercules dicumyl peroxide, is a source of free radicals, which are highly effective in chemical cross-linking. It provides a simple, economical, and practical means of cross-linking low-density polyethylene.

Cross-linked polyethylene is a thermoset material resistant to softening and deformation at high temperatures. It shows no evidence of environmental stress cracking and it is resistant to many solvents at high temperatures.

This development opens new markets for products that require superior toughness, flexibility, impact strength, and chemical resistance.

For more information on Di-cup, write

*Oxychemicals Division
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NO60-2

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DCI Magnesite • Caustic Calcined. Available in lump size or ground to your specifications.

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Use CLAREMONT Cotton FLOCKS

Claremont has served the rubber industry for over thirty years as a supplier of quality flocks produced to fit specific requirements. Whether used inside or outside, as a filler or as a finish, the superiority of Claremont Cotton Flocks is recognized by all users.

Used as a compounding agent in the manufacture of mechanical rubber goods and general sundries, Claremont Flock Fillers provide reinforcement, improve tear and abrasion resistance. Claremont flock finishes for

rubber fabrics provide a wide range of appealing textures that are uniform and long-wearing. In many applications the proper use of a Claremont flock will substantially reduce production costs.

Claremont's knowledge of the industry's needs and its capacity for large production and quick delivery have made it the country's foremost producer of cotton flocks. Samples will be furnished upon request for laboratory and test runs. Inquiries invited!

CLAREMONT FLOCK CORPORATION
CLAREMONT, NEW HAMPSHIRE

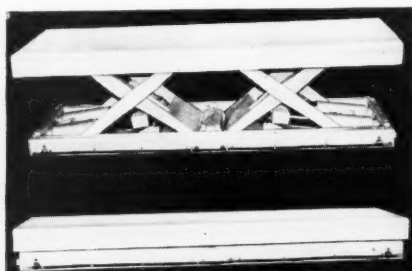
The Country's Largest
Manufacturer of Flock

new equipment



L-S portable scale truck (left) and special straddle footlift truck (right)

Further information on the straddle-type or scale footlift trucks is available from the manufacturer.



Southworth LT-12 lift table

Southworth LT-12 Lift Table

The Southworth LT-12 lift table extends the company's line of available capacities from 500 pounds in the smallest model to 24,000 pounds in this new heavy-duty tandem unit which is now available from the Southworth Machine Co., Portland, Me.

This new model, employing a hydraulic-powered, scissor-type lifting mechanism, has a collapsed height of 8.5-inches. Its extended height is 40 inches, and the lift table is available with platforms in various sizes, as well as with tops suitable for turntables, conveyor units, fixtures, or other custom-built devices.

This tandem table, with its self-contained motor and pump assembly, can be placed by the machine it is to serve and plugged in. The unit may be installed in a shallow excavation, its top thus becomes an integral part of the floor surface.

This lift table has no superstructure to hamper the operator. There is free access to the work load from any angle.

Another new development using

B.F. Goodrich Chemical raw materials



USING TWO HARDNESSES OF HYCAR

these skate wheels play a dual role

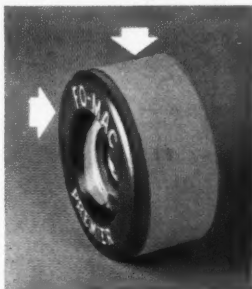
Hard on the outer edge for longer wear; softer on the inner edge for better traction, less noise. The two colors you see in these roller skate wheels show how this manufacturer has used two different Hycar nitrile rubber compounds to serve different needs in the same product.

The outer $\frac{3}{16}$ " of each wheel is a phenolic compound made with extra-tough Hycar rubber for better abrasion resistance. The inner portion of the wheel is made from a softer Hycar phenolic compound. The two are inseparably

bonded during molding.

In addition to providing extra wear and other advantages, in other applications Hycar also provides excellent resistance to oils, chemicals, and gasoline. It is often the key to improving a product or opening a

new market. For more information, write Dept. FB-7, B.F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.



PREMIER for professional skaters, and **RENTAL**, for rinks that rent out skates — wheels are made using two different Hycar nitrile rubber compounds by Fo-Mac Enterprises, Tulsa. B.F. Goodrich Chemical Company supplies the Hycar nitrile rubber.

Hycar
REG. U.S. PAT. OFF.
Rubber and Latex

B.F. Goodrich Chemical Company
a division of The B.F. Goodrich Company



GEON vinyls • HYCAR rubber and latex • GOOD-RITE chemicals and plasticizers

**See our catalog in Sweet's Product Design File.*

Another new development using

B.F. Goodrich Chemical *raw materials*

HYCAR 1000X132

**has the highest
acrylonitrile content
of any
nitrile rubber**

Solves problems of higher aromatic content created for rubber by newer fuels. Anywhere you need unusually high resistance to fuels and oils, Hycar 1000X132 can be the answer.

Easy processing, too. Despite its high acrylonitrile content, Hycar 1000X132 is easy to process. It is being used for products where building tack is required—like steel mill rolls. A variety of other commercial products utilize Hycar 1000X132.

These include: gas lift equipment (because of Hycar's exceptionally low gas diffusion properties); fuel pump seals; gasoline pump parts; aerosol spray gaskets; solvent resistant gloves; and parts exposed to dry cleaning fluids.

More information on Hycar 1000X132 and other Hycar polymers and latices is available. Write Dept. FB-8, B.F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland

15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ont.

Hycar
Rubber and Latex

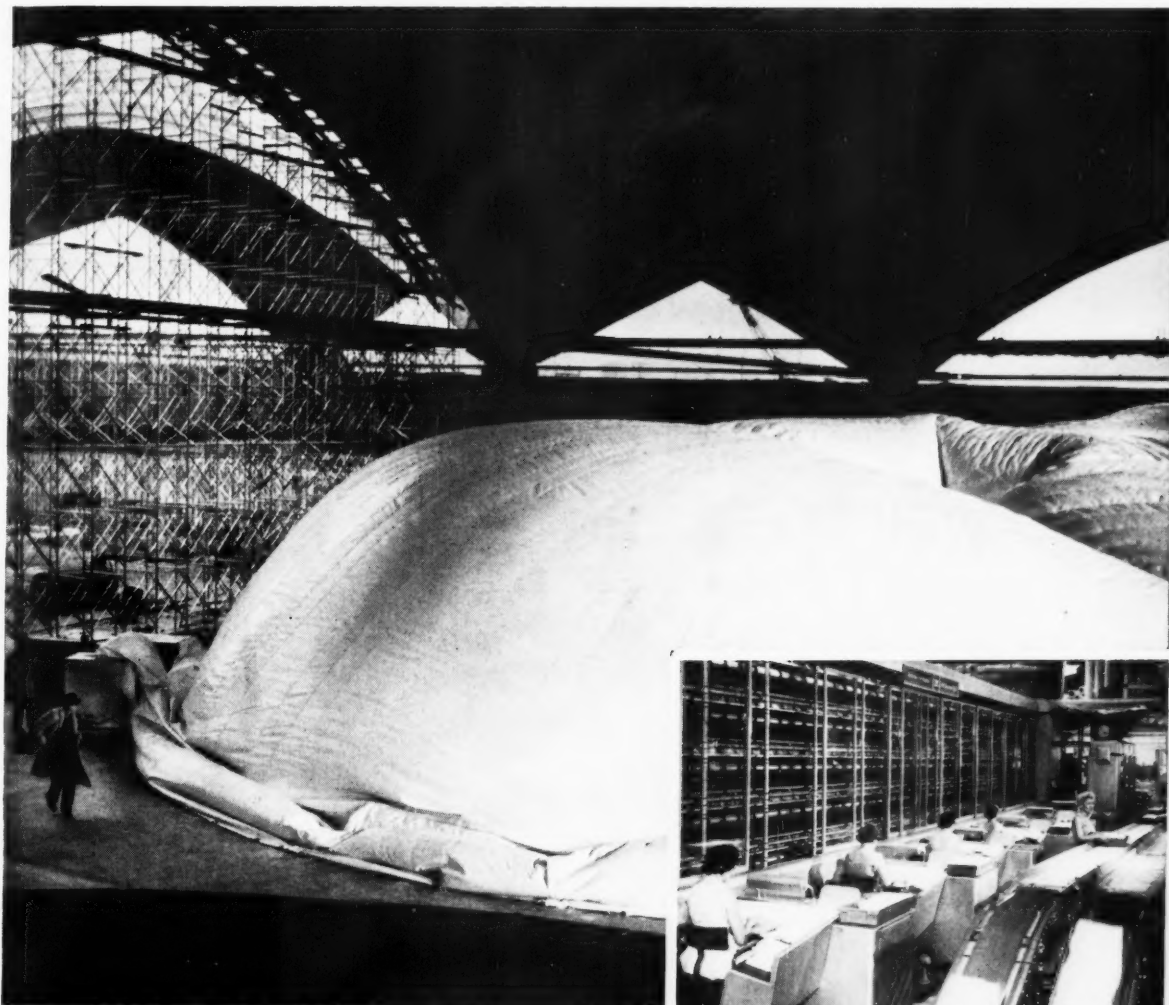
B.F. Goodrich Chemical Company
a division of The B.F. Goodrich Company



GEON vinyls • HYCAR rubber and latex • GOOD-RITE chemicals and plasticizers

See our catalog in Sweet's Product Design File

Huge fabric building speeds construction of first push-button post office



Air-supported building made by Hoosier Tarpaulin and Canvas Goods Co., Indianapolis, Ind., being inflated. Right, ITT-Inielex letter sorting machine.

The world's first fully mechanized post office—a "laboratory for the future" which promises to revolutionize mail handling—is scheduled for completion in Providence, R. I. this October.

To meet this deadline, sensitive electro-mechanical machinery for sorting letters at high speeds had to be installed even before the walls of the building went up. The problem: How to protect it during installation?

Answer: They erected a building within a building. A huge fabric air-supported structure—one of the largest of its kind—was fabricated for International Telephone and Telegraph.

The base fabric selected for this vital job was Wellington Sears Welkote, a tough nylon, coated with vinyl by Sawyer Coated Fabrics, Division of Farrington Texol Corp., Watertown, Mass.

This is just one of the many ways Wellington Sears meets the complex needs of industry with quality fabrics backed by more than a century of experience. Why not call on Wellington Sears to help solve your problems with fabrics for laminating, coating, rubberizing and many other industrial applications. Write for free illustrated booklet, "Fabrics Plus," Dept. H-8.

WELLINGTON SEARS



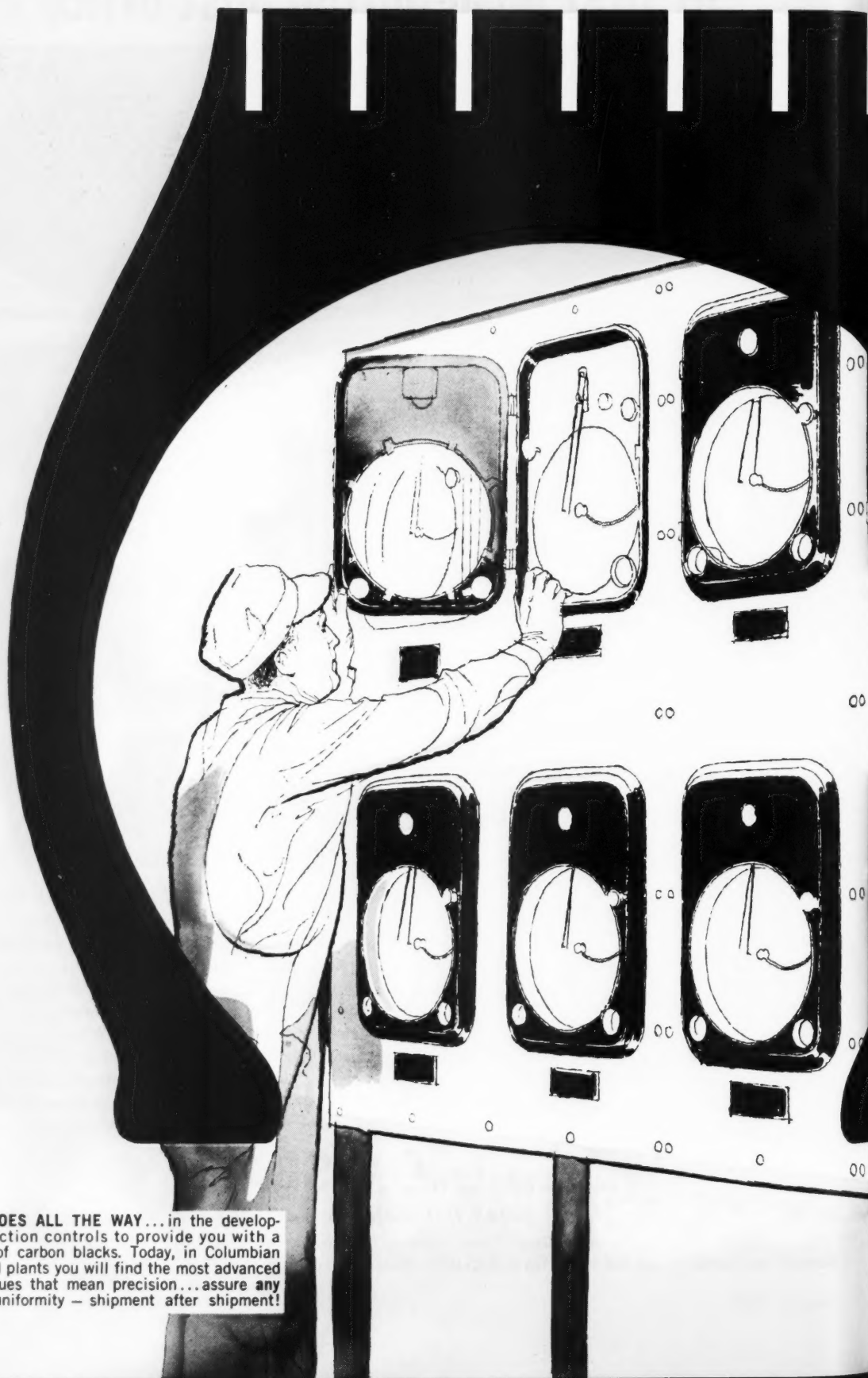
FIRST In Fabrics For Industry

For Mechanical Goods, Coated Materials, Tires, Footwear and Other Rubber Products


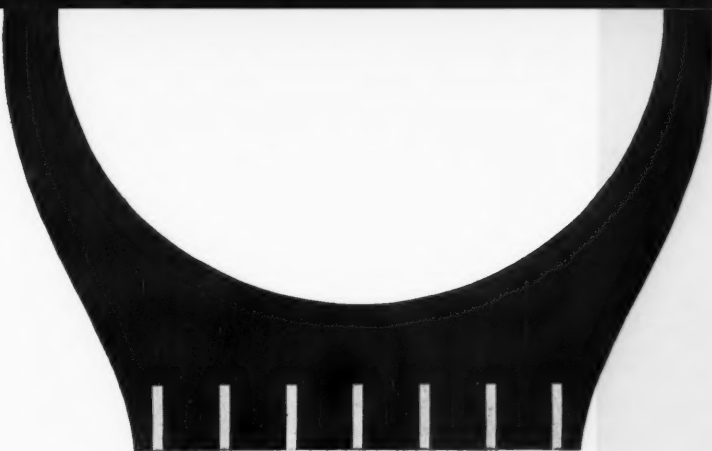
Wellington Sears Company, 111 West 40th St., New York 18, N. Y. • Akron • Atlanta • Boston • Chicago • Dallas • Detroit • Los Angeles • Philadelphia • San Francisco

August, 1960

71



COLUMBIAN GOES ALL THE WAY... in the development of production controls to provide you with a complete line of carbon blacks. Today, in Columbian laboratories and plants you will find the most advanced control techniques that mean precision... assure any user product uniformity — shipment after shipment!



COLUMBIAN...

precise production
every step of the way!

Product performance is the *proof* that Colombian's precise production methods are outstanding...provide carbon blacks that meet your most rigid requirements. Every Colombian black is produced under the most exacting production controls ...to deliver the utmost in quality...to perform flawlessly *every step of the way*. Get the complete story...today!



COLUMBIAN CARBON COMPANY
380 Madison Avenue, New York 17, N. Y.



COLUMBIAN HAS A CARBON BLACK FOR EVERY NEED

STATEX® 160 SAF Super Abrasion Furnace
STATEX 125 ISAF Intermediate Super Abrasion Furnace
STATEX R HAF High Abrasion Furnace
STANDARD MICRONEX® MPC Medium Processing Channel
MICRONEX W6 EPC Easy Processing Channel
STATEX B FF Fine Furnace
STATEX M FEF Fast Extruding Furnace
STATEX 93 HMF High Modulus Furnace
STATEX G GPF General Purpose Furnace
FURNEX® SRF Semi-Reinforcing Furnace

AND NOW
NEOTEX 100
NEOTEX 130
NEOTEX 150

CALENDAR OF COMING EVENTS

June 13-September 2

Gordon Research Conferences, Colby Junior College, New London, N. H.; New Hampton School, New Hampton, N. H.; Kimball Union Academy, Meriden, N. H.

August 19

Philadelphia Rubber Group, Annual Outing, Manufacturer's Country Club, Oreland, Pa.

September 6-16

Production Engineering Show, Navy Pier, Chicago, Ill.

September 7-9

Chemical Institute of Canada and National Research Council, Tenth Canadian High Polymer Forum, Alpine Inn, Ste. Marguerite, P.Q., Canada.

September 10

Northern California Rubber Group, Outing.

Connecticut Rubber Group, Outing.

September 11-16

American Chemical Society, New York, N. Y.

September 12-16

International Packing and Quality Conference, Singapore.

September 13-16

Division of Rubber Chemistry, ACS, Hotel Commodore, New York, N. Y.

September 19-23

International Rubber Study Group, Kuala Lumpur, Malaya.

September 26-30

Instrument Society of America, Annual Meeting and Fall Instrument-Automation Conference and Exhibit, Coliseum, New York, N. Y.

September 26-October 1

International Natural Rubber Research Conference, Kuala Lumpur, Malaya.

September 29

Southern Ohio Rubber Group, Engineers Club, Dayton, O.

September 30

Rubber Chemical Salesmen's Association of Akron, University Club of Akron, Akron, O.

October 4

The Los Angeles Rubber Group, Inc.

October 7

The Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Pa.

Detroit Rubber & Plastics Group, Inc. Detroit Leland Hotel, Detroit, Mich.

October 7

Chicago Rubber Group, Furniture Club, Chicago, Ill.

October 7-8

Southern Rubber Group, Roosevelt Hotel, New Orleans, La.

October 9-11

Rubber & Plastics Division and Erie Section, American Society of Mechanical Engineers, National Conference of Rubber and Plastics Engineers, Hotel Lawrence, Erie, Pa.

October 11

Buffalo Rubber Group, Continental Inn Hotel, Buffalo, N. Y.

October 12-23

Automobile Manufacturers Association, 1960 National Automobile Show, Cobo Hall, Detroit, Mich.

October 13

Northern California Rubber Group, Past Presidents' Night.

October 14

Boston Rubber Group, Hotel Somerset, Boston, Mass.

October 17

Elastomer & Plastics Group, Northeastern Section, American Chemical Society, Annual Meeting, Science Park, Boston, Mass.

October 17-21

National Safety Council, Forty-Eighth Annual National Safety Congress, Chicago, Ill.

October 21

New York Rubber Group, Henry Hudson Hotel, New York, N. Y.

October 28

Akron Rubber Group.

Rubber Chemical Salesmen's Association of Akron, University Club of Akron, Akron, O.

November 3

Rhode Island Rubber Club, Pawtucket Country Club, Pawtucket, R. I.

November 4

The Philadelphia Rubber Group, Fall Dance, Manufacturer's Country Club, Oreland, Pa.

November 10

Northern California Rubber Group.

November 18

Connecticut Rubber Group, Chicago Rubber Group.

November 25

Rubber Chemical Salesmen's Association of Akron, University Club of Akron, Akron, O.

November 30-December 1-2

U. S. Army Signal Research & Development Laboratory, Ninth Annual Symposium on "Technical Progress in Communication Wires and Cables," Berkeley-Carteret Hotel, Asbury Park, N. J.

December 3

Northern California Rubber Group, Christmas Party.

December 9

Detroit Rubber & Plastics Group, Inc. Christmas Meeting, Statler-Hilton Hotel, Detroit, Mich.

The Los Angeles Rubber Group, Inc. Christmas Party.

December 10

Southern Ohio Rubber Group, Christmas Party, Miami Valley Golf Club, Dayton, O.

December 13

Buffalo Rubber Group.

December 16

New York Rubber Group, Christmas Party, Henry Hudson Hotel, New York, N. Y.

Boston Rubber Group, Christmas Party, Somerset Hotel, Boston, Mass.

1961

January 20-21

Southern Rubber Group, Statler Hilton Hotel, Dallas, Tex.

January 27

Akron Rubber Group.

Chicago Rubber Group.

February 7

The Los Angeles Rubber Group, Inc.

March 10

Chicago Rubber Group.

March 17

Boston Rubber Group, Hotel Somerset, Boston, Mass.

March 24

New York Rubber Group, Henry Hudson Hotel, New York, N. Y.

April 7

Akron Rubber Group.

April 18-21

Division of Rubber Chemistry, ACS, Brown Hotel, Louisville, Ky.

May 21

American Chemical Society, St. Louis, Mo.

June 8

New York Rubber Group, Outing.

RANGE

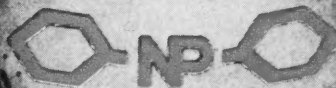
UNLIMITED

KEMPORE

EXPANDEX

NITROPORE

OPEX



in the field of **BLOWING AGENTS**

OPEX – economical, factory proven
NITROPORE – unique cross-linking properties

EXPANDEX – for high melting polymers
KEMPORE – odorless, non-staining,
non-discoloring



These National Polychemical products are a means of introducing small particles of NITROGEN GAS into rubber or plastics structures. Properly utilized, NITROGEN in this form can: Reduce Cost • Lower Hardness • Improve Electrical Properties • Improve Thermal Insulation Properties • Improve Cushioning Properties, and Increase Buoyancy. When developing your compounds to meet these new demands, our "know-how" is available.

NATIONAL POLYCHEMICALS, INC.

Wilmington, Massachusetts



Photographed with the cooperation of Mohawk Carpet Mills, Amsterdam, N. Y.

No slip showing

Modern latex backing keeps rugs attractively and economically planted. And TITANOX® white titanium dioxide pigments give carpet backings—and a wide range of other latex products—the clean, bright look demanded today.

Because of its ease of dispersion and high-hiding, TITANOX-RA-50, the multi-purpose rutile titanium dioxide pigment, is a favorite with many of America's manufacturers. However, when clean whiteness is considered more important than maximum opacity and minimum pigment content, TITANOX-A anatase titanium dioxide pig-

ment may be preferred in certain latex applications.

As it is with latex, so it is with other rubber products and plastics . . . TITANOX titanium dioxide pigments meet every requirement of performance and production. Our Technical Service Department will be happy to work with you in adapting these outstanding white pigments to your particular needs. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; offices and warehouses in principal cities. In Canada: Canadian Titanium Pigments, Ltd., Montreal.

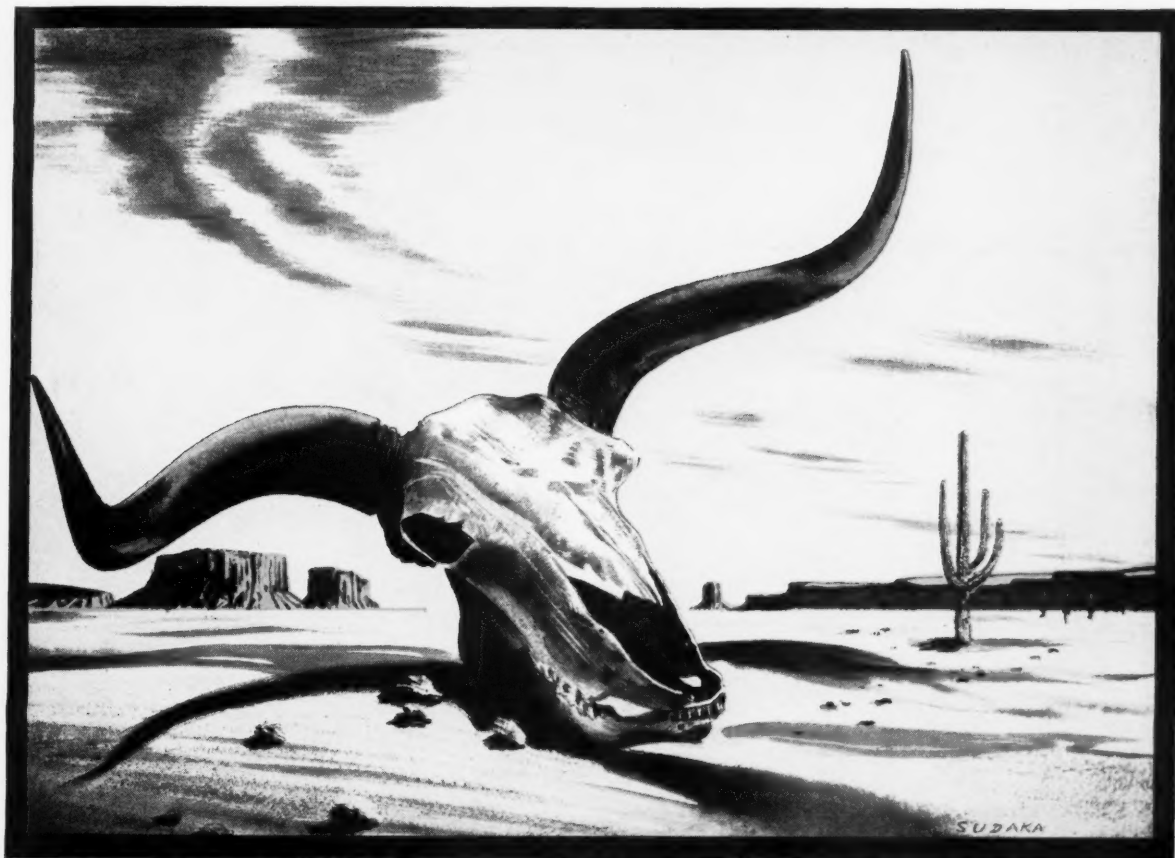
TITANIUM PIGMENT CORPORATION

SUBSIDIARY OF NATIONAL LEAD COMPANY



Naugatuck NAUGAPOL

specially processed R-S rubber



bone
dry

...always!

A BONE parching on the desert couldn't hold much less moisture than a rubber product made of NAUGAPOL®. All 6 "hot" types (1016, 1018, 1019, 1021, 1022 and 1023) and both "cold" types (1503 and 1504) of Naugapol are *specially processed for low moisture absorption* by eliminating salt as a coagulant following polymerization. Extra straining and milling further help to produce salt-free elastomers characterized by:

- LOW MOISTURE ABSORPTION
- HIGH DIELECTRIC PROPERTIES
- CLEANLINESS & UNIFORMITY
- EASE OF PROCESSING

That's why NAUGAPOL butadiene-styrene polymers are so strongly preferred by manufacturers of rubber-insulated wire and cable, mechanical rubber goods and other rubber products requiring high electrical insulating qualities and excellent mechanical characteristics over a wide temperature range. Many grades of NAUGAPOL are non-discoloring, Polygard®-stabilized polymers suitable for the finest transparent, white or color-pigmented products.



Naugatuck Chemical

Dept. 810N Elm Street
Division of United States Rubber Company Naugatuck, Connecticut

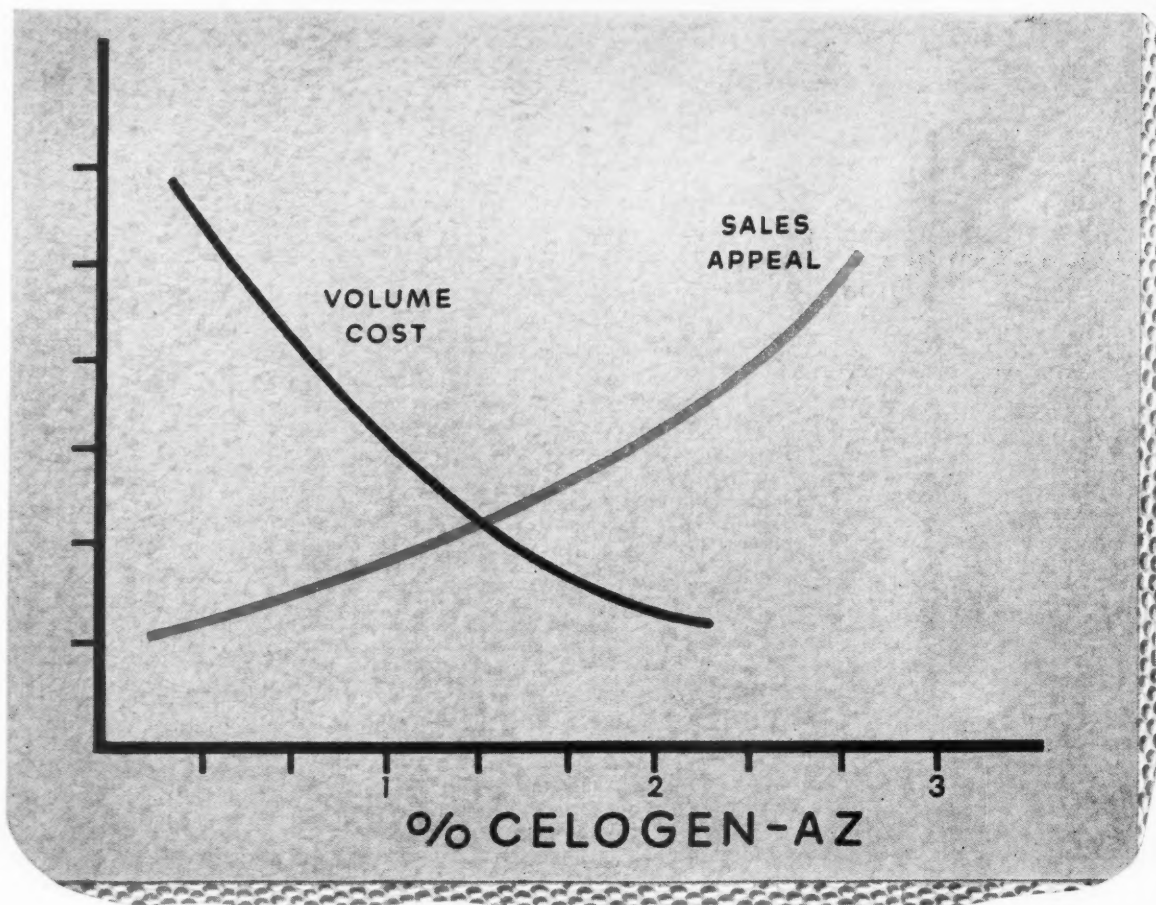


Rubber Chemicals · Synthetic Rubber · Plastics · Agricultural Chemicals · Reclaimed Rubber · Latexes · CANADA: Naugatuck Chemicals Division, Dominion Rubber Co., Ltd., Elmira, Ontario · CABLE: Rubexport, N.Y.

August, 1960

Naugatuck CELOGEN-AZ

BY A WORLD LEADER IN CHEMICAL BLOWING AGENTS



Blow new life into vinyl product sales

CELOGEN-AZ® is the special chemical blowing agent that has given vinyl products an entirely new kind of sales-making performance. And it can reduce product costs as well.

Vinyl sheeting expanded with CELOGEN-AZ has wonderful new hand... a luxurious feel and drape that rivals the finest fabrics and leathers. It is lighter, softer, more flexible.

Vinyls blown with CELOGEN-AZ have greatly increased resilience, a cushioning effect that is ideal for products ranging from table covers to floor tile. CELOGEN-AZ blown

vinyls insulate better electrically and help deaden sound. They can be given a wide range of buoyancy.

Most important, CELOGEN-AZ produces no undesirable side effects, no unpleasant odors. The rubber industry proved it. It offers entirely new product-selling opportunities to you.

Discover the advantages of CELOGEN-AZ in your own vinyl or other plastics products. Contact your nearest Naugatuck Representative or the address below.



Naugatuck Chemical

Division of United States Rubber Company

810R Elm Street
Naugatuck, Connecticut



Rubber Chemicals • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latexes • CANADA: Naugatuck Chemicals Division, Dominion Rubber Co., Ltd., Elmhurst, Ontario • CABLE: Rubexport, N.Y.

Naugatuck RECLAIM

NAUGATUCK RECLAIMS

Description

405 BROWN BLEND
A good quality brown, neutral reclaim blend with flat milling characteristics. It has excellent molding, extrusion and calendaring properties, assimilates loading rapidly and is recommended for use in heels and soles, mats, and mechanical goods.

Sp. Grav.	RHC	Tensile	Elong.	Ash	Extract	C. Black
1.35	49	1100	500	38	8	3

408 LIGHT GRAY BLEND
A light gray colored, reclaim blend possessing excellent processing, good milling and curing properties. Because of its neutral color this reclaim is recommended for use in very light colored mats and mechanical goods.

Sp. Grav.	RHC	Tensile	Elong.	Ash	Extract	C. Black
1.36	47	1030	475	40	11	

409 GRAY BLEND
A flat reclaim having good extruding, molding and calendaring properties for use in mats and mechanical goods. Very similar to #408 reclaim except darker in color.

Sp. Grav.	RHC	Tensile	Elong.	Ash	Extract	C. Black
1.40	45	900	550	42	11	3

420 BLACK BLEND
A very well refined and smooth reclaim blend which produces firm, dry compounds with excellent extrusion and calendaring characteristics. Recommended for very high grade extrusions and calendared coatings. The well dispersed loading of this reclaim can often provide savings in production, reduction of scrap and actually help increase plant capacity.

Sp. Grav.	RHC	Tensile	Elong.	Ash	Extract	C. Black
1.40	35	700	300	31	17	18

Do you know the advantages of Reclaimed Rubber?

Naugatuck's Reclaimed Rubber offers many definite and proven advantages over virgin rubber.

STABLE LOW COST—Price of whole tire reclaim is consistently about 1/3 that of natural rubber. And reclaim already contains many valuable additives.

UNIFORM MATERIAL—Rigid control of processing provides reclaimed rubber with remarkable uniformity.

SHORT MIXING TIME—Because reclaimed rubber has, in a sense, been pre-mixed, mixing time is much shorter than with natural or synthetic rubber.

LOW HEAT BUILD-UP—Reclaimed rubber has less heat build-up during mixing and other operations than natural or synthetic rubber.

FAST PROCESSING—Using reclaimed rubber imparts faster processing during extrusion and calendaring operations.

IMPROVED DIMENSIONAL STABILITY—Reclaimed rubber compounds hold their shape better than natural or synthetic rubber.

HIGH RATE OF CURE—Reclaimed rubber is faster curing than synthetic rubber. Adding it to synthetic rubber increases the curing rate of the combination.

LOW POWER COST—Since reclaimed rubber is already mixed once, power costs are less than those of mixing natural or synthetic rubbers.

AGES WELL—The reclaiming process stabilizes the hydrocarbon and minimizes reversion common to other rubbers.

To learn more about reclaimed rubber and how you can use it to advantage in your operations, call your Naugatuck representative or write for free booklet, "Reclaimed Rubber."



Naugatuck Chemical

Division of United States Rubber Company

810B Elm Street
Naugatuck, Connecticut



Rubber Chemicals • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latexes • CANADA: Naugatuck Chemicals Division, Dominion Rubber Co., Ltd., Elmira, Ontario • CABLE: Rubexport, N. Y.

August, 1960

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Naugatuck PARACRIL OZO

THE OIL-RESISTANT, OZONE-RESISTANT NITRILE RUBBER



Great new advance in hose rubber

New PARACRIL OZO—exciting development from the laboratories of Naugatuck Chemical—offers the makers and users of rubber hose a combination of properties never before available.

Hose of every description, for practically every purpose, can be tougher, less bothered by abrasion, more oil and weather resistant than ever before. *And it can be produced in any permanent color desired!*

New PARACRIL OZO offers such advantages as:

- significantly superior ozone resistance
- excellent fuel and oil resistance
- several times greater abrasion resistance
- permanent retention of bright, uniform colors

Discover first hand the dramatic new sales possibilities this proven new rubber offers you. In increased product quality. In new production economy. For full information and whatever technical assistance you may require, contact your Naugatuck representative or write the address below today.



Naugatuck Chemical

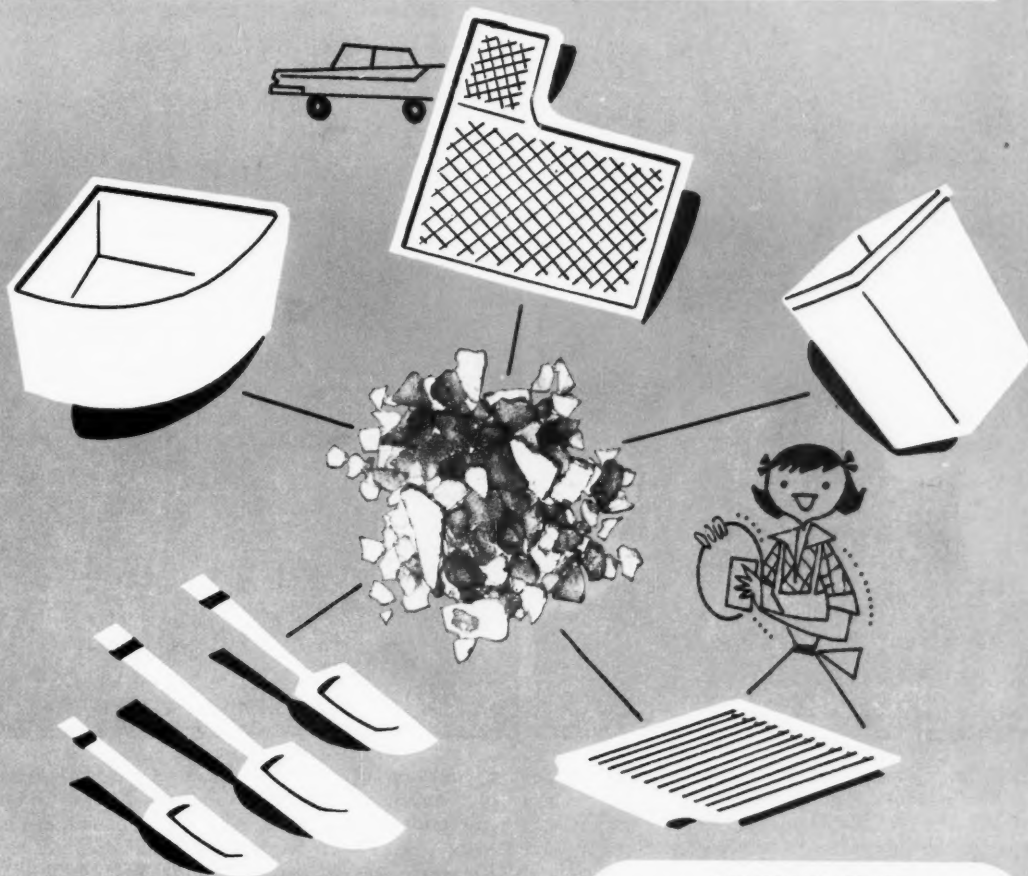
Division of United States Rubber Company

Dept. A Elm Street
Naugatuck, Connecticut



VELSICOL X-30 HYDROCARBON RESIN

makes mat stocks behave!



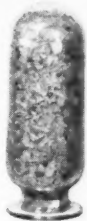
VELSICOL X-30 HYDROCARBON RESIN

Mat stocks and other stocks with high clay loadings can be made pliable and easy to process by adding Velsicol X-30 hydrocarbon resin to the recipe. X-30 enables you to use the highest clay loadings without sacrificing tensile strength, elongation, or processing characteristics. You'll get better milling, calendering, and tubing. Cures will be more uniform, and stocks non-scotchky. Toughness, hardness, and resistance to aging and abrasion will be improved. Raw materials costs will be lower, too. Write for complete information about Velsicol X-30 resin today!

PHYSICAL PROPERTIES, VELSICOL X-30 RESIN

Type: Thermoplastic Hydrocarbon
Form: Flaked
Softening point (ball and ring): 210°—220°F.
Color (coal tar scale): 1½—2
Color (Gardner): 10-11
Color (Rosin scale): I—K
Acid No.: 0-2
Saponification No.: 0-2

Compatible with a variety of natural and synthetic rubber compounds. Has good electrical insulation properties, because it is a hydrocarbon polymer.



LOOK FOR THIS MAN
... your Velsicol representative,
a qualified chemist who can help
you make better products for less!

MAIL COUPON TODAY FOR MORE INFORMATION!



VELSICOL CHEMICAL CORPORATION
330 East Grand Ave., Chicago 11, Ill.

International Representative: Velsicol International Corporation, C.A.
P.O. Box 1687 • Nassau, Bahamas, B.W.I.

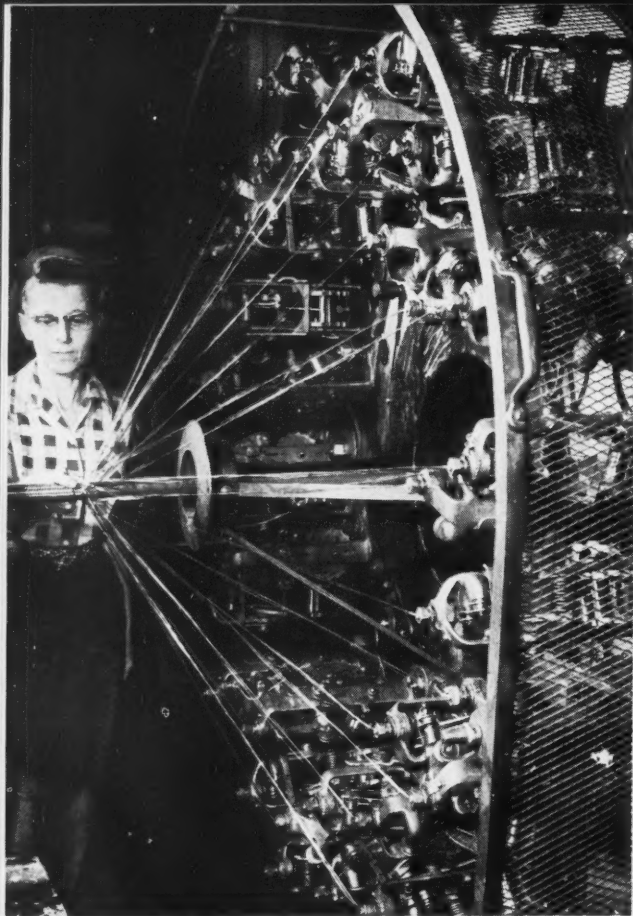
Gentlemen: I am interested in more information about your X-30 resin.

- ☐ Please send literature
- ☐ Please send test sample
- ☐ Please have salesman call

RW-80

Name _____
Company _____
Address _____
City _____ Zone _____ State _____

VELSICOL



B. F. Goodrich Company braids multiple strands of steel wire into intricate sinews around rubber tube to help control and resist tremendous internal pressures required of flexible hydraulic hose. Wire such as supplied by Johnson has tensile strengths ranging from 240,000 to 400,000 psi.



Firestone Tire and Rubber Company uses only high tensile steel wire of exacting tolerances in building tire beads. Rapidly entering the bead machine in parallel—three to fifteen wires wide, depending on strength specified—the wires are coated with rubber. Clean bronze finish on Johnson wire assures proper rubber adhesion.

The best names in rubber use Johnson wire for strength and safety in tires and hose

The rubber industry has a sound reputation for producing quality products in advance of its needs by use of imaginative research—painstaking development of production methods—careful selection and testing of component materials.

Goodyear—Firestone—U.S. Rubber—B. F. Goodrich—Thermoid and others have established their names over the years by giving the general public and industry alike—strength, safety and durability in products such as long lasting pneumatic tires and tough pressure hose.

These two products owe their strength in part to the fine steel wires hidden inside them. For it is

high-carbon steel bead wire which gives a pneumatic rubber tire—no matter what its size or job, the strength demanded by modern vehicles. Similar wire gives pressure hose its strong sinews which enable it to withstand working pressures as high as 10,000 psi—bursting strength may be three to four times as great.

Take the case of tire bead wire which Johnson supplies to every major tire manufacturer in the country. It is precision-drawn from special high-carbon rods to .037" in diameter with a tolerance of only .002"—so fine that a 750-pound reel contains 39 miles of wire. Yet, a single strand exceeds 290 pounds of break-

ing strength equal to a tensile strength of 270,000 psi.

Also the wire must present a clean, unbroken surface and have a good and uniform bronze finish. This finish makes possible tight adhesion between the wire and the rubber surrounding it.

All these qualities contribute to the tire bead strength, help assure the safety of those who ride for work or pleasure on pneumatic tires.

Another special wire made by Johnson for the rubber industry helps rubber hose contain enormous pressures demanded by modern industrial applications. This reinforcing wire is drawn from selected high-

Ther
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Thermoid Division, H. K. Porter Company, has cut wire rewind loss to $\frac{1}{2}$ of 1% by use of Johnson Discard-a-Spool which eliminates overlaps and tangles, protects wire quality in shipment. The one-way disposable spool weighs only 28 ounces vs 200 ounces for standard spool—slashes tare weight 14 times.



United States Rubber Company wires tires for strength on this bead building machine. The strength comes from the steel wire bead in the edge of each tire. Johnson makes special high-carbon steel wire—.037" in diameter with tolerance of only .002" for U.S. and other major tire companies.

carbon steel in diameters ranging from .008" to .020" and has exceptional dimensional accuracy—tolerance is plus or minus .0005".

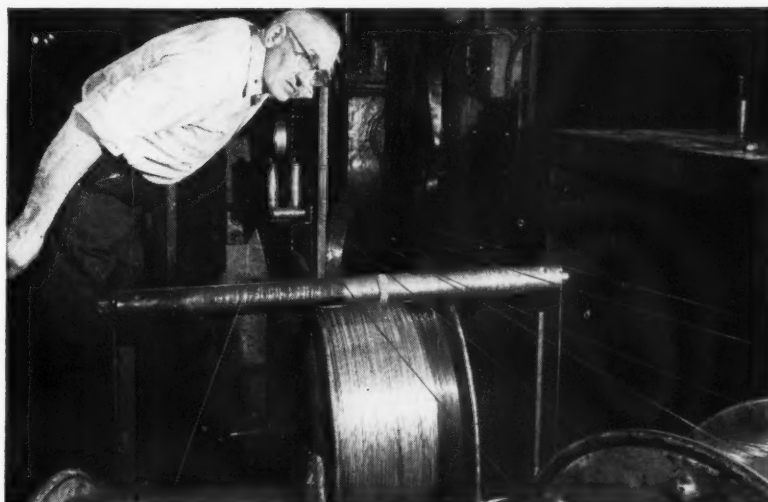
Johnson hose reinforcement wire is supplied with a special liquor finish to provide maximum adhesion of steel to the rubber which fills the interstices between braids.

The wire is uniformly cast to make possible even spooling and has uniform tensile strength to prevent breaking under the working tension.

These excellent wire qualities, plus careful packaging and prompt delivery, have resulted in Johnson becoming a prime supplier to the rubber industry for hose reinforcement wire.

The outstanding performance of Johnson wire in the rubber industry is typical of the experience in other industries where Johnson supplies aircraft cord wire, armature binding wire, wire for brushes, metal stitching, preformed staple wire, bobby pin wire, rope wire, oil tempered and MB hard drawn spring wire, and music spring wire in a wide variety of sizes and finishes.

If you use specialty wires, call one of the offices listed to right and explore the advantages of Johnson quality which combines strength with economy.



The Goodyear Tire & Rubber Company finds that Johnson meets their exacting requirements for tire bead wire which has high tensile strength, twisting strength, elongation and special surface finish. Here parallel tire bead wires uncoil evenly into a bead building machine.

Johnson Steel & Wire Company, Inc.

Worcester 1, Massachusetts

a subsidiary of Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.



DISTRICT SALES OFFICES

Akron	Cleveland	Detroit	New York	Pittsburgh
Chicago	Dayton	Houston	Philadelphia	Tulsa
			Warren, Ohio	





HOW THE **SILICONES MAN** HELPED REMEDY MANY TIRE MOLD RELEASE HEADACHES

Today you can simplify and lower the cost of inside and outside tire paint formulations, including tread release agents—with a versatile line of silicone oils perfected by your UNION CARBIDE Silicones Man. It includes:

L-522 Silicone as a base for inside tire paint using Bag-O-Matic technique.

The same silicone for outside paint. Does not interfere with knitting.

LE-45 Silicone diluted to 1% or less, sprayed or swabbed in mold, for sure release of intricate tread designs. Or, LE-46 Silicone—the *only stable emulsion* made from high viscosity silicone fluid. It can be diluted up to 30%

more than emulsions made from lower viscosity oils.

All these UNION CARBIDE silicones prevent residue build-up in molds, keep patterns cleaner. They are heat-stable and do not cause soot, smoke, or flammability problems.

Your Silicones Man can help with your mold release problems in tires, mechanical rubber goods, plastics, many other fields. Contact one of the offices of The C. P. Hall Co., or write Dept. HS-4004, Silicones Division, Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. *In Canada:* Union Carbide Canada Limited, Bakelite Division, Toronto 12.

Unlocking the secrets of silicones

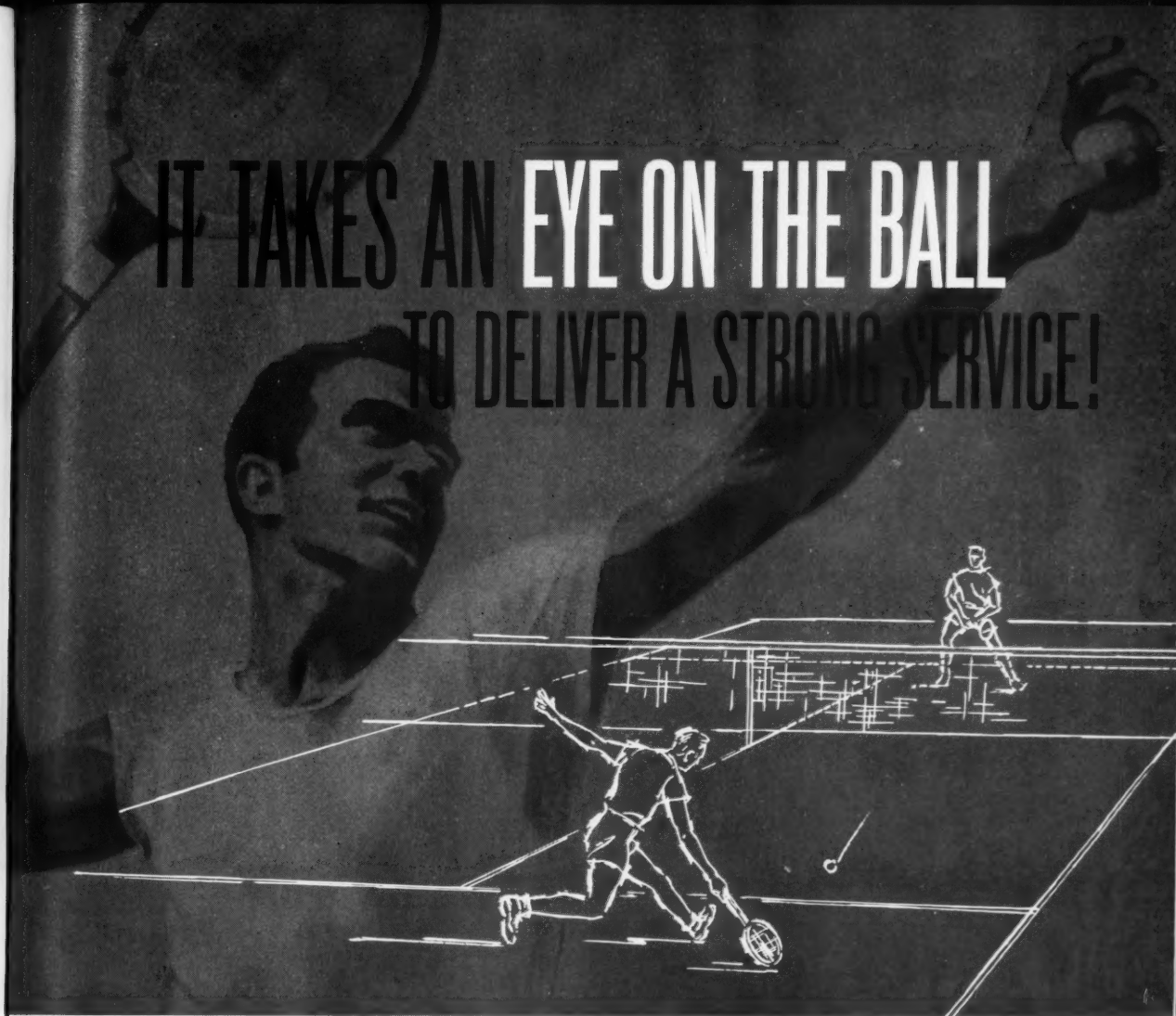
Rubber, Monomers, Resins, Oils and Emulsions

"Union Carbide" is a registered trademark of UCC.



SILICONES

IT TAKES AN EYE ON THE BALL TO DELIVER A STRONG SERVICE!



AN EYE-ON-THE-BALL intensity is ASRC's open secret of success. That's because synthetic rubber is our *business*, not a by-product. All our efforts have but one purpose...the strongest possible service for you through better polymers, better packaging, better deliveries. That's why we've been able to develop new SBR numbers that make your processing easy; that save you time and money. That's why ASRC's #3110 has the lowest Mooney in the

market. That's why we've won a reputation for uniformly high quality, time after time, run after run. That's why you can depend on the help ASRC's technical specialists give you.

Why not find out how ASRC's "eye-on-the-ball" specialization can often be an "eye-opener" for you? For the polymers and the personnel to solve your most difficult compounding problems...
Call on ASRC today!

AMERICAN SYNTHETIC RUBBER CORPORATION

EXECUTIVE OFFICES AND PLANT • LOUISVILLE 1, KENTUCKY

General Sales Offices: 500 FIFTH AVENUE, NEW YORK 36, N. Y.

1130 Second National Bldg., Akron 8, O. 38 S. Dearborn St., Chicago 3, Ill. 1909 Riverbend Pkwy., Fremont, O.



Watch Out For "EXPENSIVE BARGAINS" in ZnO!

Are You Tying Your Reputation For Product Quality to The Price Of Zinc?

Fluctuating zinc prices mean users of secondary ZnO can "enjoy" marginal savings over primary ZnO. But on this margin — about 5¢ per 100 pounds of finished compound — rests your reputation as a manufacturer of a quality rubber product.

WHY RISK YOUR REPUTATION FOR PENNIES?

Here, for example, is an "expensive bargain." Our laboratories analyzed two different lots of secondary ZnO from the same supplier and found:

1. LEAD VARIATION .04 to .11
2. SULPHUR VARIATION .15 to .32
3. BOTH HAD PRESENT AN APPRECIABLE QUANTITY OF GRITTY PARTICLES

These results are typical. For a minute saving, the secondary ZnO user risks UNPREDICTABLE CURING RATES, DISCOLORATION IN LIGHT-COLORED RUBBER PRODUCTS and STRUCTURAL FAILURE IN THIN-WALLED RUBBER PRODUCTS.



Hardly a bargain... instead 3 very good reasons for using

ST. JOE Lead-Free primary ZnO!

St. Joe uses the same ores to make ZnO as is used for the production of 99.99+ % Special High-Grade slab zinc. This coupled with St. Joe's exclu-

sive methods of quality control gives you primary ZnO with consistent analyses unmatched in the industry.



ZNO-151

As A Producer of Natural and Synthetic Rubber Products,
YOU CAN SET YOUR PROCESSING,
OUR OXIDE WILL NOT CHANGE

ST. JOSEPH LEAD CO.

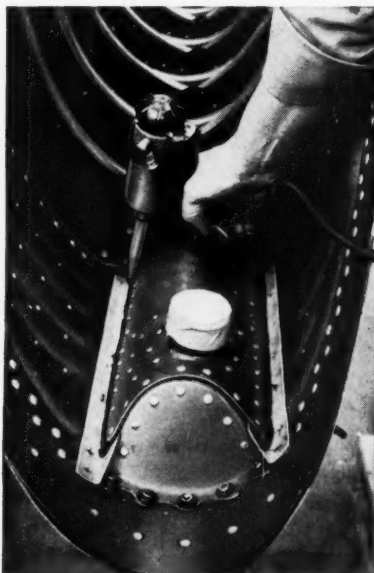
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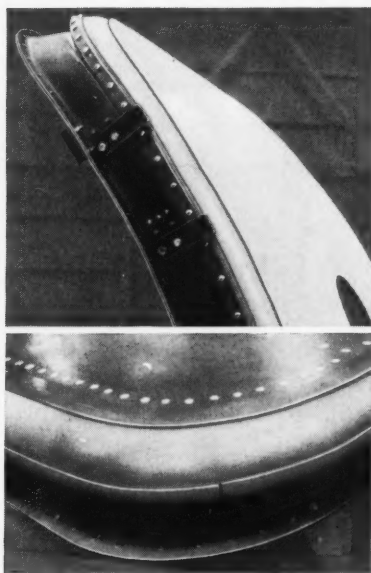
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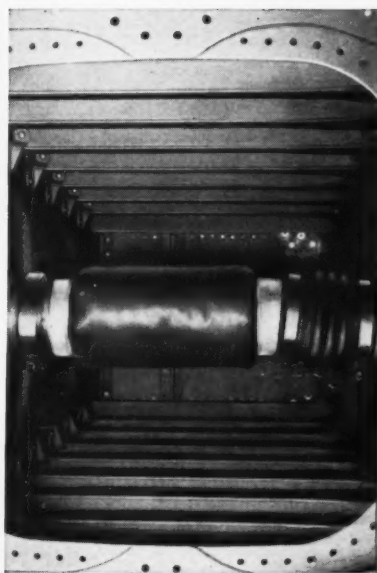
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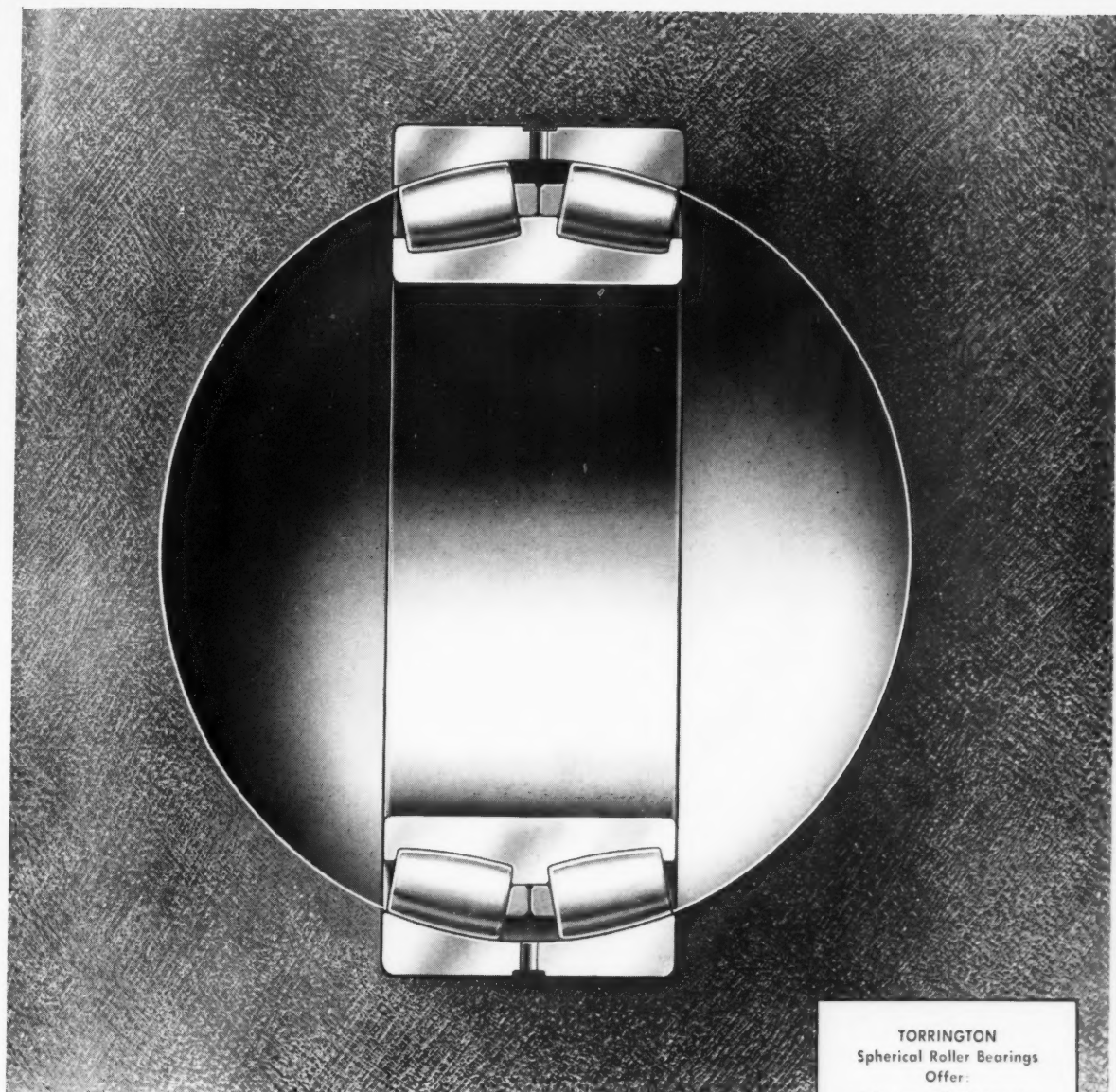
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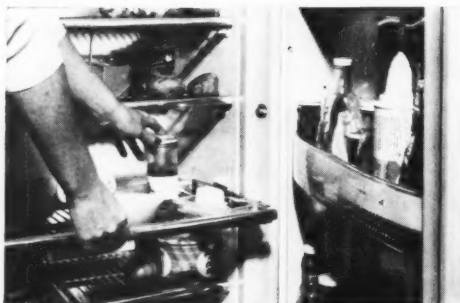
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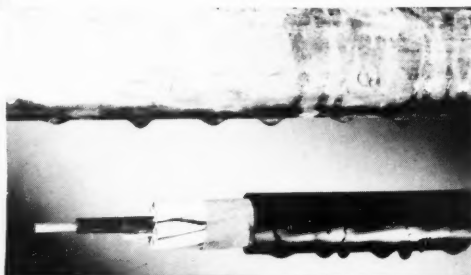


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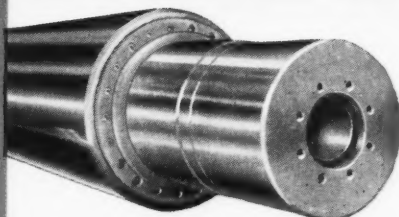
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editorial

Future Process and Material Advances Should Keep Rubber Industry Ahead

What are likely to be the developments of the future in production facilities and in basic raw materials used by the rubber goods manufacturing industry? Will they be adequate for maintaining and possibly increasing the industry's growth rate? These are questions which must be faced continuously by management, particularly during these days of rising labor and raw material costs and increasing competition from abroad.

Will complete automation of production facilities be achieved by means of the "Big Thinker" in the form of a general-purpose computer aided by special-purpose computers in the various departments coupled with increased mechanization of process lines? Will the improved rubbers of the future provide the manufacturer with basic raw materials that are more versatile and in many cases superior in quality to anything he has experienced to date? Speakers before a recent meeting of the Southern Rubber Group think the answers to these questions will be in the affirmative even though full realization of most of these developments may take from five to fifteen years and may require that some of the ideas of management and engineers be changed in the course of such realization.

For example, H. K. Hochschwender, of Hochschwender & Associates, and G. V. Kullgren, of Hale & Kullgren, Inc., both of Akron, O., believe that design engineers will utilize computers for electronic operation in combination with almost completely automatic operation in the plant of the future. They make the point, however, that this plant will produce extremely varied product lines in most cases and that the dream of greater product standardization will have to be abandoned. Plants of the future will be designed from the standpoint of maximum flexibility

and breadth of product lines, and this means that smaller, more flexible equipment rather than larger and larger equipment with more and more total output of one item will be required.

It was predicted that with this plant of the future, production and delivery lead times will be reduced in the factory and in the distribution system by about one-half to three-fourths. The whole plant will be a line production process; there will be practically no in-process inventory, and top management will have to set goals for sales and individual production areas in such a way that decisions at the operating level can be made on a sound overall company interest basis.

In the field of raw materials, Paul W. Cornell, of Goodrich-Gulf Chemicals, Inc., suggested that the use of more expensive extender oils in styrene-butadiene rubbers would result in elastomers with properties more closely resembling those of natural rubber than is presently the case. These new SBR's will provide lower hysteresis to extend the use of this synthetic rubber in heavy-duty tires.

The new low structure, fine particle size carbon blacks will be followed by other new blacks, some of which will require new polymers to take full advantage of their properties.

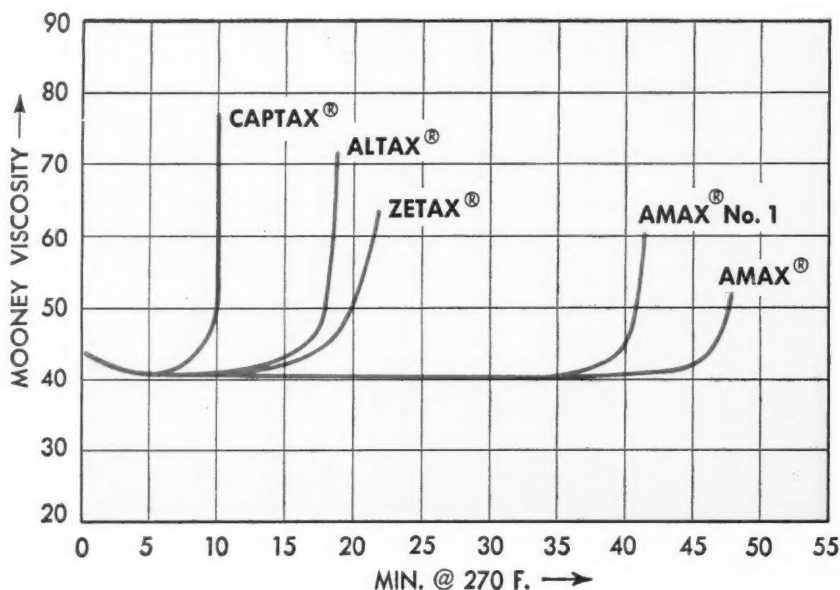
Improvements in synthetic *cis*-polyisoprene are expected to make this rubber not only equal to, but better than natural rubber. *Cis*-polybutadiene with even greater abrasion resistance will be provided while its excellent resilience will be further exploited.

Olefin rubbers, such as the new ethylene-propylene copolymers, require a new cure system to permit their use in high-speed production, but it was predicted that such a system would be developed.

Thus, the plant and raw materials of the future hold much promise for achieving an accelerated growth rate for the rubber goods industry and should come at a time when they are most needed.

R. G. Seaman
EDITOR

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Ray Thoman



Frank Kadlec

Frank Kadlec, research engineer, Gates Rubber Co., attended Charles University, Prague, Czechoslovakia; Denver University Law School; and Northwestern University, where he took courses in mathematics and chemistry.

Mr. Kadlec has been employed by the Gates Rubber Co. since 1956.

Ray Thoman, chief chemist, Gates Rubber Co., received his B.S. degree in chemistry and geology from the University of New Mexico in 1942. He belongs to the American Chemical Society and the Rubber Reclaimers Association.

ALMOST all rubber compounds contain a certain amount of oil or wax. There are several reasons for the introduction of these ingredients into the rubber compound including the reduction of internal friction for ease of processing, improved low-temperature flexibility, and cost reduction. In the latter case, an appreciable amount of oil is usually mixed with the polymer, either during the manufacture of oil-extended rubbers or subsequently during the compounding and mixing in the rubber products plant.

In the study reported in this paper, we are not concerned with the effect of oil on the processing characteristics of the uncured polymer or on its cured physical properties, but rather with the behavior of the oil-loaded compound (hereafter referred to as oil donor) when adjacent to an oil-free compound (hereafter referred to as oil acceptor).

It is assumed that oil, similarly to other compounding ingredients, migrates into surrounding stocks or into the atmosphere. This oil migration is a result of a phenomenon known as diffusion of matter. The diffusion is a transport of matter resulting from thermal

Oil Migration Study¹

Migration from high to lower oil content stock demonstrated by visual and chemical methods

By FRANK KADLEC and RAY THOMAN

Gates Rubber Co., Denver, Colo.

motion of particles (1).² The matter has a tendency to be evenly distributed in the surrounding gas, liquid, or solid.

Migration and diffusion of various compounding ingredients through high polymers was observed by a number of investigators. Kuzminskii and collaborators studied the kinetics of the diffusion of antioxidants in rubber (2); Shanin studied the diffusion and solubility of oxygen and hydrogen in sodium butadiene rubber (3); Coe (4), Quackenbos (5), Beck and Rosenberg (6) studied migration of plasticizers in vinyl chloride; Masslov investigated migration of accelerators (7); Kemp, Malm, Stiratelli studied the solubility and diffusion of sulfur in synthetic elastomers (8); and several investigators were concerned with the migration of compounding ingredients between two stocks during heat or oxygen aging while the stocks were not in intimate contact (9, 10).

The use of oil-extended and highly oil-loaded compounds present certain manufacturing and product performance problems in the rubber industry. The awareness of these problems was the motivating force for this study. For this reason it was directed, first, to prove that oil migration did take place and, second, to establish a method of detecting and following the oil migration, a method simple and efficient enough to be used in connection with every-day manufacturing problems. Even with these limitations, the study grew complex enough to prevent more sophisticated mathematical expression of the kinetics of oil migration at this time.

This study presents our findings as to oil migration during vulcanization and after both accelerated aging (heat aging) and unaccelerated aging (shelf aging) and describes a simple visual method for observing oil migration. The combination of acetone extract determinations and observations under ultraviolet light represents a practical method of following the move-

¹ Presented before the Division of Rubber Chemistry, ACS, Buffalo, N. Y., May 4, 1960.

² Numbers in parentheses refer to bibliography references at the end of the article.

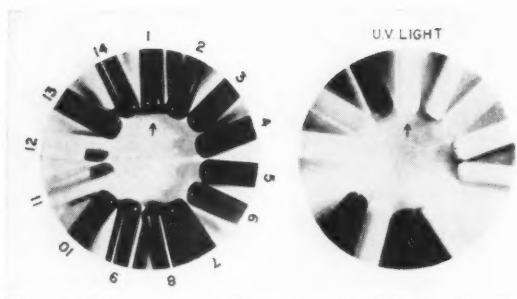


Fig. 1. Comparison of 14 commonly used oils under conventional and ultraviolet light. Identification of oils according to the numbers is as follows: (1) light process oil; (2) Picco 30; (3) Plasticizer SC; (4) Cumar P 25; (5) Petrolatum; (6) process oil; (7) Califlux GP; (8) pine tar; (9) butyl oleate; (10) asphalt oil; (11) Faxum 40; (12) DOP, dioctyl phthalate; (13) TP 90B; (14) DOS, dioctyl sebacate. Note only three oils, pine tar, DOS, asphalt oil, are not luminescent under U. V. light

ment of certain oils throughout the cured polymer. Since rubber compounds are sometimes conditioned for a period of time before being vulcanized, our study includes observations on oil migration between two uncured polymers. The net effect of oil migration on the resulting physical properties or product performance of vulcanizates is, however, beyond the scope of the present study. We wish to report here only on a few basic concepts established and the methods used.

Compounds containing oil are identified in this report as *oil extended* when referring to polymer extended with oil during manufacture, such as SBR 1712, or *oil loaded* when referring to compounds where oil is introduced during the mixing of the stock in the rubber goods manufacturing plant.

Experimental Details

All stocks were mixed in a standard laboratory model "B" Banbury mixer. Caution was exercised continuously to prevent any contact between the different compounds. All equipment was kept oil free and was thoroughly cleaned between runs with individual stocks. Samples were cured in a single-cavity 1- x 4- x 6-inch mold. The stocks were calendered to 0.125-inch by 4-inch strips, and these strips were rolled in polyethylene film to prevent any diffusion of their components into the air and contact with other stocks. Samples were prepared by plying up the desired number of layers of calendered stock. Whenever a multiple-layer (sandwich-type) pad was required, the individual component parts were kept separated until immediately prior to cure in order to prevent migration between uncured stocks.

After the pads were cured, they were cut in three equal parts and aged as follows: on a dark shelf (wrapped in plastic film), on roof (unwrapped), and in hot air oven or hot room (wrapped in film).

Where roof exposure is indicated, the samples were

exposed in Denver, Colo., at a 45-degree angle facing south. Roof exposure began on February 1, 1958. In 1958, the average temperature for the year was 52.8° F., the precipitation, 13.96 inches, maximum temperature, 96° F., minimum temperature, 6° F. There was an average of 8.4 hours of sunshine per day.

In 1959, the average temperature for the year was 51.3° F., the precipitation, 13.74 inches, maximum temperature, 96° F., minimum temperature, -9° F. There was an average of 8.3 hours of sunshine per day or almost 70% of the theoretically possible amount (11).

The oils used were selected from those which are luminescent under ultraviolet light having a wavelength of 2536 to 3660 Angstrom units. The sources of ultraviolet light were a mercury vapor lamp type H-4³ (wavelength 3660 Angstrom units) and a "Mineralight" model V-43⁴ (wave length 2536 Angstrom units).

The ultraviolet-light method of following oil migration is limited to non-black rubber compounds since the luminescence of oil in black stocks is overshadowed by their black color, and a variation in the amount of oil present only varies somewhat the greyness of the compound under ultraviolet light. The following table shows the relation of the compound colors as they appear under different exposures to conventional and ultraviolet light.

Compound	Visual Observation		Ultraviolet Photograph
	Convent.	U. V.	Black and white
Black, no oil	Black	Black	Black
Black, with oil	Black	Grey-black	Grey to black
White, no oil	White	Purple	Light grey
White, with oil	White	White	White

³ Hanovia Lamp Division, Englehard Industries, Inc., Newark 5, N. J.

⁴ Ultra-Violet Products, Inc., San Gabriel, Calif.



Fig. 2. Comparison of photographs under conventional and ultraviolet light of sample of black oil-donor and white oil-acceptor stocks after exposure. Fluorescent band in ultraviolet-light photograph on right shows penetration of oil from black oil-donor

All photographic work was done with a Bausch & Lomb⁵ photomicrographic camera, model "L," using Protar IV lens, Kodak⁶ Wratten 2B and X-1 filters were used. The film used was Ansco⁷ Versapan.

Factors Affecting Oil Migration

The rate of diffusion of a substance from one location to another is a function of temperature and concentration. The quantity of diffused substance is, in turn, a function of time. In the work reported here, then, oil will tend to migrate from the oil donor into the oil acceptor until equilibrium or near equilibrium is reached. The rate of migration will depend on the difference in the amount of oil present in the various stocks and the surrounding temperature.

It has been found that the amount of cross-linking will affect the diffusion coefficients of homologous paraffin hydrocarbons (12), and that the kinetics of diffusion of antioxidants in rubber depend on the concentration and temperature (2). L. L. Best (13) investigated at length the bloom of waxes and their diffusion through rubber. He found the storage temperature had considerable effect on the rate of growth of bloom. He established further that the rate of migration was dependent on the amount of filler contained in the stock, since the gum compounds had a higher rate of migration (13).

The state of cure of either of the component parts in migration studies is critical. An undercured stock will be a poorer oil donor than a stock tightly cured, since the oil is more soluble in the undercured stock, and therefore the plasticizer it contains has a lower driving force.

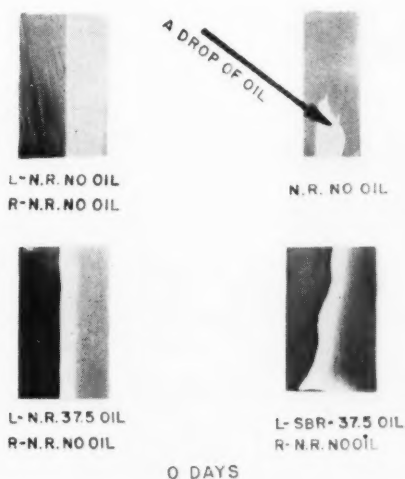


Fig. 3. Ultraviolet-light photographs of three black and white sandwiches and of a slab of white control stock on which a drop of oil was placed. When no oil is present in the black compound, the white compound remains grey. When the white compound is cured adjacent to a black oil-donor stock, a white band appears in the grey color of this stock, indicating the migration of the oil

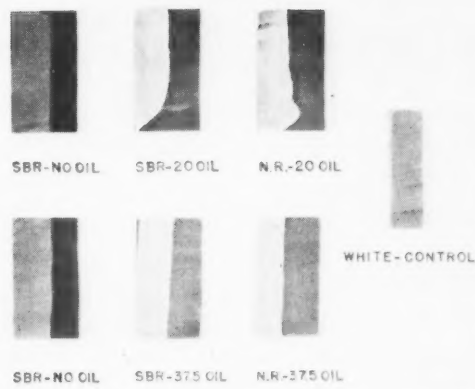


Fig. 4. Ultraviolet-light photographs of samples after six months' roof exposure. The oil completely penetrated the acceptor stock cured next to an oil-donor stock containing 37.5 parts of oil. With only 20 parts of oil present the penetration was not yet complete

Discussion of Results

The use of ultraviolet light is not new in rubber technology. Determination of the heat history of a vulcanizate and identification of compounding ingredients are two of its applications (14). In the present work, ultraviolet light is used to trace the diffusion of oils between various rubber stocks.

U. V. Light Oil Luminescence

Figure 1 shows a comparison of 14 commonly used oils as they appear under conventional and under ultraviolet light. Only three of these oils, pine tar, DOS, and asphalt oil are not luminescent and cannot be traced by ultraviolet light having a wavelength of 2536 or 3660 Angstrom units, the wavelengths used in obtaining these photographs.

Oil Migration during Vulcanization

In Figure 2 a two-component sample of black oil donor and white oil acceptor stocks after vulcanization is shown as it appears under conventional and under ultraviolet light. While under conventional light only the black and white parts can be identified; under ultraviolet light a fluorescent band in the white (grey in photograph) section shows the oil which penetrated from the black oil-donor compound.

Figure 3 shows an ultraviolet-light photograph of three black and white sandwiches and the white control stock after vulcanization, but without further aging. It can be seen that when no oil is present in the black oil-donor compound, the white oil acceptor compound remains grey. When the white compound is cured adjacent to a black SBR or natural rubber compound containing, in this case, 37.5 parts of oil, however, a white band appears in the white (grey in photograph) compound, indicating penetration of oil

⁵ Bausch & Lomb Optical Co., Rochester, N. Y.

⁶ Eastman Kodak Co., Rochester, N. Y.

⁷ General Aniline & Film Corp., New York, N. Y.

TABLE 1. ACETONE EXTRACT VALUES FOR OIL-DONOR AND OIL-ACCEPTOR COMPOUNDS AFTER ROOF EXPOSURE ALONE AND AS TWO-COMPONENT SANDWICHES

% Acetone Extract on Stocks Exposed Alone								
Roof Exposure, Days	A	B	C	D	E	F	G	H
0	2.51	13.15	21.17	5.45	16.22	24.15	26.53	2.20
30	2.44	13.28	21.15	5.51	16.39	24.17	26.57	2.29
90	2.60	13.11	20.74	5.25	16.10	23.83	26.30	—
180	2.32	12.89	20.00	5.00	15.92	23.70	26.02	—
390	2.03	—	19.93	5.02	15.72	23.47	25.97	—
760	2.28	—	19.76	4.98	15.53	23.12	25.20	—

On Two-Component Sandwiches								
Days	Control A	With B	With C	With E	With F	With G	With H	
0	2.51	2.55	2.53	2.53	2.54	3.69	2.51	
30	2.44	2.64	2.80	2.54	3.16	2.62	2.47	
90	2.60	3.20	3.91	3.07	3.03	3.47	2.53	
180	2.32	4.15	4.65	3.76	4.10	5.69	2.21	
390	2.03	5.20	7.70	4.56	5.24	6.61	2.08	
760	2.78	5.45	7.61	5.00	6.80	8.19	2.08	

On Two-Component Sandwiches					
Days	Control D	With B	With E	With F	With G
0	5.45	5.42	5.39	5.50	5.55
30	5.51	5.41	5.44	5.42	5.26
90	5.25	5.68	5.91	5.97	6.00
180	5.00	6.76	7.79	6.28	6.37
390	5.02	7.20	7.47	6.20	8.88
760	4.98	8.08	7.94	9.64	9.25

Stock Formulations								
	Ⓐ	B	C	Ⓓ	E	F	G	Ⓗ
Natural rubber	100.00	100.00	100.00	—	—	—	—	100.00
SBR 1712*	—	—	—	—	—	—	137.50	—
1500*	—	—	—	100.00	100.00	100.00	—	—
HAF black	50.00	50.00	50.00	50.00	50.00	50.00	50.00	—
TiO ₂	—	—	—	—	—	—	—	50.00
Sulfur	2.00	2.00	2.00	1.80	1.80	1.80	1.80	2.00
Santocure†	0.50	0.50	0.50	1.00	1.00	1.00	1.00	0.50
DOP oil	—	20.00	—	—	20.00	—	—	—
Dutrex 20‡	—	—	37.50	—	—	37.50	—	—

Ⓐ Ⓓ — Oil Acceptors, Black
Ⓗ — Oil Acceptor, White (for U. V.-Light Photos)
B, C, E, F, G — Oil Donors

* Shell Chemical Corp., synthetic rubber division, Torrance, Calif.
† Monsanto Chemical Co., rubber chemicals department, Akron, O.
‡ Shell Chemical Corp., New York, N. Y.

during vulcanization. Note the same white color in the natural rubber compound on which a drop of oil was placed.

Figure 4 is an U.V.-light photograph of two component sandwich samples and a control after vulcanization and six months' roof exposure. The oil completely penetrated the formerly oil-free acceptor stock when this stock was cured adjacent to an oil-donor stock containing 37.5 parts of oil. If the oil-donor stock contained only 20 parts of oil, a small section of the oil-acceptor stock still does not show evidence of oil penetration.

In Figure 5, acetone extract values obtained from the samples shown in Figures 3 and 4 are plotted. Note that while the acetone extract values of the white acceptor control compound are decreasing owing to

evaporation of oil with time, the values of the acceptor compound cured adjacent to the oil-donor compound are increasing with time.

In Table 1, acetone extract values of several oil-donor and oil-acceptor compounds after roof-exposure from 0 to 760 days in Denver, both alone and in two component sandwiches, are tabulated. The same pattern as observed in Figure 5 is apparent. With the two-component sandwiches, the acetone extract and therefore the oil content of the oil acceptor increase with time while the oil content of the oil donor decreases. With the individual samples of the compounds, the oil content decreases owing to diffusion into the air. It follows, then, that oil will migrate from the oil donor into the oil acceptor even under unaccelerated aging conditions when the oil migration is at the same

TABLE 2. OIL MIGRATION OF UNCURED STOCKS ON AGING

Aging, Days, 130° F. Oven	(% Acetone Extract After Cure) Stocks					
	I with X		J with X		K with X	
0	7.84	7.83	7.88	7.83	14.50	14.50
30	7.32	10.61	7.31	10.27		16.00
90	6.12	11.15	6.74	11.34		16.26
% Change	-21.9	+42.4	-14.4	+44.8		+12.1

Shelf, 75° F.						
0	7.84	7.83	7.88	7.83	14.50	14.50
30	7.56	9.40	7.66	8.69		14.95
90	6.78	9.68	7.52	9.57		15.33
% Change	-13.5	+23.6	-4.5	+22.2		+5.7

TABLE 3. OIL MIGRATION OF UNCURED STOCKS ON AGING—EFFECT ON TENSILE STRENGTH

Aging, Days, 130° F. Oven	(Tensile in psi. after Cure) Stocks					
	A with X		B with X		C with X	
0	3425	3425	3075	3075	2725	2725
7	3475	3475	3100	2200	2950	3200
14	3200	1875	2950	2175	2725	2575
21	3350	1800	2875	2250	2725	2700
28	3250	2250	3000	2300	2700	2575

% Original acetone extract						
	7.84	7.84	7.88	7.88	14.50	14.50

time further reduced by the diffusion of oil into the air.

The formulations of the several oil-donor and oil-acceptor compounds are included in Table 1.

Migration with Unvulcanized Stocks

L. L. Best, in his work with the blooming and migration of wax (13), notes that "for some reason wax does not migrate from unvulcanized stock. It may be that the heat treatment during vulcanization gives this migration effect, not necessarily the vulcanization process; or it may be the solubility of wax in unvulcanized stock is much greater."

We have found that oils do migrate at room temperature between two uncured stocks. The rate of migration will be much slower than, for example, during vulcanization or accelerated heat aging. This first type of migration is of great importance in the cases where the uncured product is conditioned or aged for an appreciable period of time before being vulcanized.

The behavior of an oil-donor and oil-acceptor system in the uncured state was also studied, therefore, and the results are presented in Tables 2 and 3. The "sandwiches" used for this work were prepared and used in the following manner. The stocks were plied up in the uncured state and aged for the times and at the temperatures indicated. At the end of the aging period they were peeled apart and cured into tensile plates from which the physical properties and acetone extract results were obtained. The data on the control samples (0 days) were obtained before plying up the stocks.

An oil-acceptor stock consisting of 100% natural rubber compound, (I) was compared to an 80/20 blend of natural rubber with nitrile rubber (Hycar 1042), (J), and a natural rubber/SBR black masterbatch blend, (K). These oil acceptors were aged adjacent to an oil-extended rubber (SBR 1712) oil-donor compound, (X). (See Appendix for complete formulations for these compounds.) Table 2 shows that oil migrated into the straight natural rubber compound I, as well as into the natural/nitrile rubber blend compound J. The rate of migration increased

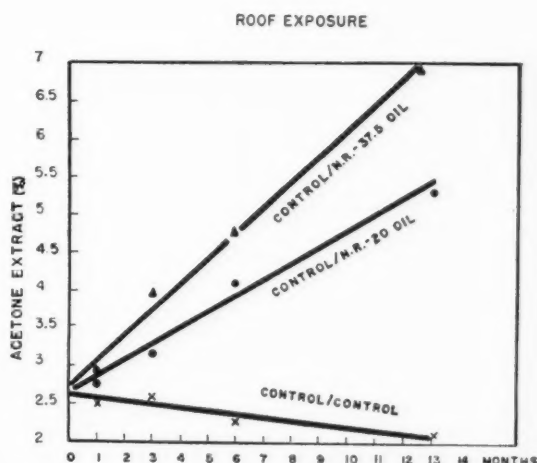


Fig. 5. Acetone extract on samples shown in Figures 3 and 4. Note that value for control not in contact with oil donor is decreasing while value for control adjacent to oil donor increases with time

with the increase in the aging temperature, as expected. While the control pads for I and J, owing to the diffusion of oil into the air, show an acetone extract decrease from -4.5% to -21.9% after 90 days' aging, the same stocks, when aged adjacent to the oil donor X, show an acetone extract increase from 22.2 to 44.8%.

Compound K, a blend of natural rubber and SBR black masterbatch, had an original acetone extract value much higher than the values for compounds I or J. After being aged adjacent to the same oil donor compound X, however, K shows an increase in acetone extract value of 5.7 to 12.1%. We can conclude then, that owing to the higher original oil content of K and the smaller differential in oil content with respect to the oil donor X, K is more resistant to oil migration from X. (Complete data from which Table 2 was prepared will be found in the Appendix.)

In Table 3 the effect of oil migration between two uncured stocks during aging at 130° F., one an oil donor and the other an oil acceptor, on the stress-

TABLE 4. OIL MIGRATION DURING VULCANIZATION
—VARIOUS RUBBERS

Oil Acceptor	NR	SBR 1500	Neo- prene GN	Chloro- butyl Rubber	Nitrile Rubber*
	% Acetone Extract				
Cured alone	1.75	4.03	1.44	1.38	3.09
Cured with donor	3.55	5.55	2.77	1.89	3.79
Increase	1.80	1.52	1.33	0.51	0.70
Compound Recipe					
Polymer	100.0	100.0	100.0	100.0	100.0
TiO ₂	100.0	100.0	100.0	100.0	100.0
ZnO	5.0	5.0	5.0	5.0	5.0
Stearic acid	2.0	2.0	2.0	2.0	2.0
Sulfur	2.5	2.0	—	—	2.0
Santocure†	0.5	0.5	—	—	0.5
MgO	—	—	4.0	2.0	—

* Hycar 1042, B. F. Goodrich Chemical Co., Cleveland, O.

† Monsanto Chemical Co., rubber chemicals department.

strain properties of the vulcanizates is shown. The all-natural rubber compound I shows a significant drop in tensile strength after two weeks' aging; the 80/20 natural nitrile rubber blend compound J also shows a drop in tensile strength even though not so pronounced as for I. The NR/SBR black masterbatch blend compound K retains its tensile strength better than either I or J under the conditions of the test.

It should be noted that the replacement of 20 parts of natural by nitrile rubber in compound J oil acceptor did not reduce the extent of the oil migration from compound X, as shown in Table 2, although the effect on the tensile strength of J was somewhat less than on I.

Oil Migration—Various Rubbers

In Table 4, natural rubber, SBR, Neoprene GN, chlorobutyl rubber, and nitrile rubber are compared as to oil penetration during vulcanization when cured adjacent to an identical oil donor. It seems that the degree of oil migration during vulcanization is not a function of oil resistance of the base polymer in the oil acceptor, but that it is related to the permeability of the polymer in the oil-acceptor compound.

Figure 6 is an ultraviolet-light photograph of the samples discussed in Table 4. Note the variation in the width of the fluorescent band in relation to the acetone extract value after oil migration.

Limitations of Methods

Ultraviolet-light observations are limited to non-black compounds. Where a test sample or product consisting of black compounds is under investigation for oil diffusion, tracers of white stock inserted at critical points can be used. When the oil reaches the white tracer, the tracer becomes luminescent under ultraviolet light.

As mentioned above, non-fluorescent oils such as DOS, pine tar, and asphalt oil are not suitable to be traced by ultraviolet light.

Acetone extract, on the other hand, has the disadvantage that it does not indicate the relative distribution of oil throughout the body, but it is informative only as to the oil concentration at a particular point. While it is desirable to obtain samples near the contact surface between the stock, this aim is often difficult where there is no difference in the color of the stocks. It is suggested that where possible, both methods, ultraviolet light and acetone extract, be used to verify results.

Summary and Conclusions

It is shown that oils, similarly to other compounding ingredients, tend to migrate from a compound containing higher amount of oil into a relatively oil-free compound, both between cured and uncured stocks. This migration can be followed by acetone extract determinations and ultraviolet-light observations. Significant amount of oil migrates during vulcanization, regardless whether the oil-acceptor compound is oil-resistant or not. Limitations of the proposed methods are outlined.

Acknowledgment is made to H. E. Todd for supporting laboratory and photographic work, and to The Gates Rubber Co. for permission to publish this study.

Bibliography

- (1) G. L. Clark and G. G. Hawley, "Encyclopedia of Chemistry," p. 305. Reinhold Publishing Corp., New York, N. Y. (1957).
- (2) A. C. Kuzminskii, S. A. Reitlinger, E. V. Shemastina, *Rubber Chem. Tech.*, 29, 145 (1956).
- (3) L. L. Shanin, *Ibid.*, 29, 602 (1956).
- (4) B. Coe, *Rubber Age (N. Y.)*, 72, 220 (1952).
- (5) H. M. Quackenbos, Jr., *Ind. Eng. Chem.*, 46, 1335 (1954).
- (6) G. Beck and A. Rosenberg, *Kunststoffe*, 12, Appendix (1952).
- (7) Masslov, Bouravaya, *J. Rub. Ind. (U.S.S.R.)*, 12, 142 (1936). Abstract in *Rubber Age (London)*, 18, 314 (1937).
- (8) Kemp, Malm, Stratelli, *Ind. Eng. Chem.*, 36, 109 (1944).
- (9) M. B. Fackler and J. S. Rugg, *Anal. Chem.*, 23, 1646 (1951).

DIFFUSION DURING VULCANIZATION

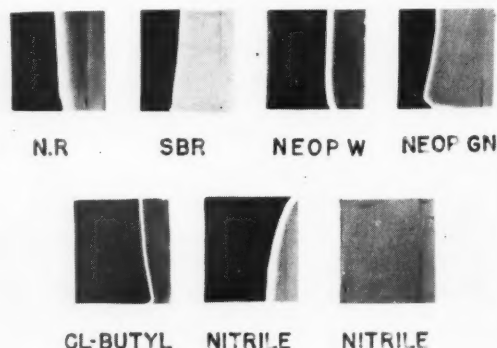


Fig. 6. Ultraviolet-light photographs of two-component sandwiches of several rubbers used in migration tests

- (10) A. E. Juve and R. Shearer, *Rubber Chem. Tech.*, 27, 448 (1954).
 (11) United States Weather Bureau, Denver, Colo.
 (12) R. M. Barrer and G. Skirrow, *J. Polymer Sci.*, 3, 549; 3, 564 (1948).
 (13) L. L. Best and R. C. W. Moakes, *Rubber Chem. Tech.*, 24, 1017 (1951).
 (14) M. L. Berman and V. I. Rachkalik, *Kauchuk i Rezina*, 16, 12, 33 (1957).

APPENDIX

COMPOUND FORMULATIONS FOR TABLES 2 AND 3

	I	J	K	X
Natural rubber	100	80	60	—
Hycar 1042	—	20	—	—
Carbomix 3751*	—	—	62	—
SBR 1712	—	—	—	137.5
SRF black	20	20	—	—
FEF black	20	20	30	—
HAF black	—	—	—	75
Reogen†	2	2	—	—
Pine tar	10	10	8	—
Dipentene	2.5	2.5	—	—
Califlux‡	—	—	—	14
MBTS	—	—	—	.35
NOBS Special§	.8	.8	—	—
Crystex#	3.1	3.1	2.1	—
Sulfur	—	—	—	1.8
Santocure	—	—	1.2	—
DPG	—	—	.2	—
Vultac #2¶	—	—	3	.35
ZnO	15	15	8	4
St. acid	1	1	2.5	2.7
Aminox**	.5	.5	—	—
BLE**	—	—	2	—
Thermoflex††	—	—	1	—

* Copolymer Rubber & Chemical Corp., Baton Rouge 1, La.

† R. T. Vanderbilt Co., New York, N. Y.

‡ Golden Bear Oil Co., Bakersfield, Calif.

§ American Cyanamid Co., Rubber Chemicals Department, Bound Brook, N. J.

Stauffer Chemical Co., New York, N. Y.

¶ Pennsalt Chemicals Corp., Philadelphia, Pa.

** Naugatuck Chemicals Division, United States Rubber Co., Naugatuck, Conn.

†† E. I. du Pont de Nemours & Co., Elastomer Chemicals Department, Wilmington, Del.

OIL MIGRATION BETWEEN UNCURED STOCKS ON AGING—COMPLETE DATA TO TABLE 2

	Aging, Days	% Acetone Extract After Cure		
		Roof	Shelf	Oven, 130° F.
I Compound Alone	0	7.84	7.84	7.84
	30	7.21	7.56	7.32
	90	7.21	6.78	6.12
% Change		- 8	-13.5	-21.9
I Adjacent to X	0	7.83	7.83	7.83
	30	8.71	9.40	10.61
	90	8.98	9.68	11.15
% Change		+14.8	+23.6	+42.4
X Adjacent to I	0	26.28	26.28	26.28
	30	25.88	26.58	24.96
	90	25.67	26.18	23.77
J Compound Alone	0	7.88	7.88	7.88
	30	7.47	7.66	7.31
	90	7.53	7.52	6.74
% Change		- 4.2	- 4.5	-14.4
J Adjacent to X	0	7.83	7.83	7.83
	30	8.33	8.69	10.27
	90	9.34	9.57	11.34
% Change		+19.2	+22.2	+44.8
X Adjacent to J	0	26.81	26.81	26.81
	30	26.47	26.21	24.62
	90	25.98	25.53	23.37
K Compound Alone	0	14.50	14.50	14.50
	30	15.81	14.95	16.00
	90	15.80	15.33	16.26
% Change		+ 8.9	+ 5.7	+12.1
X Adjacent to K	0	26.33	26.33	26.33
	30	26.33	26.02	25.35
	90	26.04	26.31	24.61

Cure: 60 min./280° F.

IDENTIFICATION OF OILS IN FIGURE 1

Name	Composition	Supplier
1. Light process oil	75 Naphthenic/25 paraffin oil	Golden Bear Oil Co., Bakersfield, Calif.
2. Picco 30	Polymerized aromatic distillate	Pennsylvania Industrial Chemical Corp., Clairton, Pa.
3. Plasticizer SC	Glycol ester of vegetable oil fatty acid	Harwick Standard Chemical Co., Akron, O., sales agent
4. Cumar P 25	Polymers of indene, coumarone, and associated coal-tar compounds	Harwick Standard Chemical Co.
5. Petrolatum	Vaseline	Allied Chemical & Dye Corp., Plastics & Coal Chemicals Division, New York, N. Y.
6. Process oil	50 paraffinic/50 naphthenic	Continental Oil Co., New York, N. Y.
7. Califlux GP	Naphthenic hydrocarbons, primarily unsaturated	Texas Oil Co., New York, N. Y.
8. Pine tar	Complex mixture of neutral and acidic substances of vegetable origin	Golden Bear Oil Co.
9. Butyl oleate	Butyl oleate	Godfrey L. Cabot, Inc., Boston, Mass.
10. Asphalt oil	Blended petroleum residue	C. P. Hall Co., Chicago, Ill.
11. Faxum 40	Paraffinic oil	Witco Chemical Co., Akron, O.
12. DOP	Diethyl phthalate	Carter Oil Co. Division, Humble Oil & Refining Co., Houston, Texas
13. TP 90 B	High molecular weight poly-ether	Carbide & Carbon Chemicals Co., San Francisco, Calif.
14. DOS	Diethyl sebacate	Thiokol Chemical Corp., Trenton, N. J.
		Harwick Standard Chemical Co.

Firestone's Presupervisory Training Program

Selection of supervisory personnel can no longer depend on haphazard methods, but must be based upon some more concrete plan such as presented here

By H. H. WIEDENMANN

The Firestone Tire & Rubber Co., Akron, O.

The Author

Herbert H. Wiedenmann, vice president, tire production, The Firestone Tire & Rubber Co. has been in supervisory positions at the company since 1934.

He joined Firestone in 1928 in development, where he served until being named general foreman at the California plant in 1934. He has held various managerial posts in the West Coast plant and in Akron and in January of this year was named vice president.



THE growth of American industry during the last 20 years has seen a concurrent growth in the importance of the lower levels of supervision as the broad link between top management and the men on the machines.

There was a time not so long ago when a supervisor saw that his men got their jobs done, and that was that. The supervisor's job, generally, was to boss the men doing the work he used to do. In many instances he was chosen on the basis of seniority in the department, or the retiring supervisor merely adopted someone to succeed him. This adopted successor served an apprenticeship to acquire technical information and then took on the responsibilities as the superior released them. On the whole, the concept of a supervisor's qualifications was extremely narrow.

Today, however, the effective supervisor must be infinitely more than a taskmaster. He must be a man of many talents—a man with plenty of know-how not only of the job he is supervising, but also the know-how of dealing effectively with people.

For one thing, he is a key man in employe relations. To the man on the line, he is the closest representative of management. The supervisor serves as the direct line of communication between policy-level personnel and the employe on the line. It is the supervisor who must properly indoctrinate and train new employes on the job. It is he who gives the orders. It is he who must maintain good working relations.

Upon the supervisor depend production and employe morale. In short, the efficient functioning of his unit depends on the supervisor's job know-how and on his actions and attitudes toward people. This is a big job.

The average supervisor heads 20 people, each one representing a \$12,000 investment. This constitutes a business with a capital investment of \$240,000 for each supervisor to run. It is important that he know every component of his "business," which is basically how to handle the machines, the materials, and the men.

Today the supervisor must not only get the job done. He must understand that the success of his job depends to a great extent on the realization that he is working with other human beings. The modern supervisor must have a certain adeptness in human relations. He must have a way with people.

This is certainly not a new concept. However, with the growth of industry in the U.S.A., particularly since 1940, top management has realized more and more the need of a closer, more immediate relation between management and the employe—a type of relation which must begin with the supervisor.

For nearly 40 years Firestone has had training programs to groom men for management positions in all phases of the business—sales, production, and administration.

But in the early 1950's, Firestone management, looking to the future, saw that the rubber industry, a natural growth industry, would go through a major



One of the discussion conferences of the Firestone presupervisory training program in session

expansion in the decades ahead. This meant that millions of dollars would be spent on new products, new processes, and new plants.

This posed the question: Where are we going to get the trained manpower to staff the new plants?

To prepare for this anticipated growth at Firestone, top executives inaugurated an intensive and comprehensive training program—a program which would fit Firestone employees for supervisory jobs. This new presupervisory training program was set in motion in Akron in 1954.

This program has a twofold purpose: to provide an opportunity for capable, ambitious employees to improve themselves in order to move up in the company; and to provide the company with a better qualified and better trained supervisory staff.

Candidates for the program, however, realize that promotions are not assured just because they successfully complete the course. On the other hand, it is company policy to promote to supervisory positions only those who are graduates of the course.

While the course of instruction and study was being prepared, an extensive survey was made to determine the number of men who would be needed to fill supervisory positions because of company plans for expansion of its manufacturing facilities and because of retirements and promotions. These figures were based on periods of two years each.

As a result, the course is repeated every two years in order to maintain an adequate roster from which to fill supervisory positions.

Selection of Candidates

To qualify for the presupervisory training program, a man must be a Firestone employee. In order to obtain the best possible men from among the employees, Firestone's training department set up a seven-step selection plan designed to pick the best candidates in the judgment of several people and on the basis of extensive testing. In other words, being chosen for the training is something of which to be proud.

1. The major consideration for eligibility are specific age and educational requirements, which are checked out first.

2. A thorough study is made of the work records of those employees who pass the first test.

3. The foreman of each prospective candidate evaluates his job performance, initiative, personal habits, and his ability to get along with his fellow employees.

4. Candidates, then, complete a comprehensive questionnaire in which they must state their reasons for interest in the program and list all previous job experience, additional education, outside activities, and hobbies.

5. At this point, personal interviews are set up between prospects and trained interviewers who determine the applicant's attitude, personality, his capabilities, and ambitions.

6. Candidates still in the running at this point take a battery of intelligence, personality and aptitude tests.

7. Assuming the candidate has come this far, a composite of all the tests is reviewed, and his ratings on items one through five are considered in determining whether he is accepted for the program or rejected.

Training Program

The program itself runs approximately four months, with 66 hours of classroom work in addition to outside study, reading and preparation. All work is done on the employee's time.

The conference-type program is used extensively. Groups are divided so that each class is limited to approximately 25 members. This makes it possible for each member to participate fully in all discussions.

Classes meet in a two-hour session twice a week. These sessions incorporate practical demonstrations, panel discussions, films, and other visual-aid materials to make the program interesting and educational.

Training department staff members lead most of the classes and discussion groups. Other sessions are led by service department managers. Representatives of top management as well as key people in every phase of the Firestone organization participate in the conferences.

Material covers every important aspect of supervisory responsibility—from the orientation of new employees to job method improvement and a study of the company-union agreement.

The first unit in the program is a study of the Firestone company—its history, the breadth of its operations, its diversified products, its policies and programs.

Several periods, then, are devoted to the do's and don'ts of instructing others on the job. These are followed by practice sessions in which each trainee prepares a demonstration of his own choosing and actually instructs other members of the group.

Trainees instruct their classmates on such things as the proper method of cutting rubber, how to read a slide rule, how to splice a film, or how to assemble a fuse. The demonstrations are kept relatively short and simple, but nonetheless they serve to make the potential supervisor aware of the necessary steps in job instruction.

The economics of the American system of competitive free enterprise are outlined in several meetings.

Instructors emphasize the factors responsible for our country's material progress and the part private industry plays in maintaining our leadership in the free world.

The company's annual report is discussed and analyzed—where the money comes from and where it goes. Costs of goods, services, wages, and taxes, profits and balance sheet are carefully examined and explained.

Time study, job evaluation, and work simplification are taken up in other sessions; while still others delineate the supervisor's responsibility in the maintenance of quality and its important relation to sales.

The supervisor's job in maintaining employee safety is discussed by the company's safety manager, plant protection officers and fire chief. Trainees learn the techniques which brought about the company's fine safety record and how to maintain it.

Throughout the entire program strong emphasis is placed on the human relations factor between supervision and the men on the line, and its basic importance in the efficient operation of the plant.

The ability to get work done through others requires certain skills of leadership beyond mere job knowledge. The ability to deal effectively with people is equally important. A man who wants to move ahead on the management team must learn about the people with whom he works—their needs, desires, and reactions—and how best to treat them. He must understand and learn the rules of leadership and motivation—the motivation that compels men to work to their full capabilities.

To emphasize the importance of this factor and to point up the supervisor's responsibility in human relations and communications, six sessions are held.

The first session in the Human Relations and Communication series, "Leadership in Supervision," emphasizes and analyzes the qualities of a good leader.

These include:

1. A good supervisor accepts responsibility and success without letting it turn his head.
2. He never hesitates to show appreciation for a good job well done.
3. He is a master of himself, exercises self control.
4. He is loyal to his men and sticks up for them whenever he can.
5. He never makes a promise he cannot keep.
6. He never takes credit for ideas of others—particularly the ideas of his own men.
7. He doesn't play favorites.
8. He doesn't pass the buck, but rather admits his own mistakes.

Classes are devoted also to the methods of understanding people, handling grievances and maintaining discipline.

It is estimated that the average manager spends at least 80 per cent of his time on the job communicating. Among other duties, he must give directions and orders, pass along information to and from management, train employees, indoctrinate new employees, settle disputes and plan and coordinate work.

Effective management depends on effective communication—which simply means being understood and understanding others. The session, "Communication in Industry," analyzes the barriers to good communications and explains fundamentals in building a favorable climate for good communications.

Barriers to communication are many in a large industry—the physical size and distances involved in large factories tend to separate management from the employees, preventing contacts necessary for effective communication. There is also the problem of communicating from one shift to another. In addition, there are word barriers, attitude barriers, emotional and temperamental barriers.

Rules offered the supervisor as a means of building a favorable climate for communicating include: be approachable; keep an open door; learn to listen; avoid arguments; and maintain frequent personal contacts on the job.

Other training hours are devoted to the interpretation and understanding of the company-union agreement. This is done so that each supervisory candidate has a thorough knowledge of the contract in order to enable him to answer questions intelligently and carry out the provisions of the agreement.

In addition to this overall training, separate sessions are held for employees in each of their various plants—tire, reclaim rubber, steel products—so that they may become more familiar with the operations and production procedures of their own plants. Employees from each of the plants attend separate meetings in which plant managers and production managers participate to discuss cost control, quality, timekeeping, scheduling, engineering, and product development.

Candidates must pass four examinations throughout the course, and upon satisfactory completion, diplomas are presented at a special dinner which is given in honor of the graduates.

Results

Of the more than 200 men that completed the first three programs in our Akron plants, nearly 80% have been promoted to supervisory positions or to good staff jobs. A fourth class of 89 men is now in progress and will be concluded this summer.

Because of the enthusiasm with which the program was greeted in Akron, it has been adopted in all major operations of the company.

Since we are on the verge of graduating only our fourth class, we feel that no final judgment on the program can be made. We do know, however, that the men going into supervisory positions are, generally speaking, much better qualified as a group because of this training.

And, in hundreds of small ways, we get the feeling of a smoother-running operation where it counts most—improved production operations, improved morale, and an adequate supply of trained men to fill supervisory jobs.

For this reason, we feel the cost of the program is being more than offset by these gains.

Available Dry Styrene-Butadiene Rubbers (SBR)—United States and Canada

Extensive industry activity during the past year has led to many changes in list as published in June, 1959, thus prompting this revised, up-to-date listing

- New Total — 160 Grades
- 10 Numbers Changed
- 47 Rubbers Added
- 27 Rubbers Dropped

TABLE 1. ABBREVIATIONS FOR
STYRENE-BUTADIENE RUBBER TABULATION

Abbrev.	Description
A	Aromatic Oil
AL	Alum
Amt	Amount
AS	AMERICAN SYNTHETIC RUBBER
Bu	Butadiene
BAL	Brine-Alum
Bd.Sty.	Bound Styrene
Coag.	Coagulant
CR	COPOLYMER RUBBER & CHEMICAL
Emul	Emulsifier
EPC	Easy Processing Channel Black
FA	Fatty Acid Soap
FEF	Fast Extruding Furnace Black
FS	FIRESTONE SYNTHETIC RUBBER & LATEX
G	GENERAL TIRE & RUBBER
GA	Glue-Acid
GG	GOODRICH-GULF CHEMICALS
GT	GOODYEAR TIRE & RUBBER
HA	Highly Aromatic Oil
HAF	High Abrasion Furnace Black
HPO	Heavy Processing Oil
ISAF	Intermediate Super Abrasion Furnace Black
MT	Medium Thermal Furnace Black
MV	Mooney Viscosity, ML-4' @ 212° F. When underscored = MV on compounded stock
N	Naphthenic Oil
N-NS	Naphthenic Oil-Non-Staining
NC	NAUGATUCK CHEMICAL
NS	Non-Staining
PC	PHILLIPS CHEMICAL
PO	POLYMER CORP., LTD.
RA	Rosin Acid Soap
Sty.	Styrene
SA	Salt-Acid
SBR	Styrene-Butadiene Rubber (ASTM Designation)
SC	SHELL CHEMICAL
Spec.	Special
SRF	Semi-Reinforcing Furnace Black
SS	Slightly staining
ST	Staining
Stab.	Stabilizer
TU	TEXAS-U. S. CHEMICAL
UR	UNITED RUBBER & CHEMICAL

TABLE 2. PRODUCERS' TRADE NAMES

Prod. Abbrev.	Trade Names
AS	ASRC
CR	Copo, Carbomix
FS	FR-S
G	Gentro, Gentro-Jet
GG	Ameripol
GT	Plioflex
NC	Naugapol
PC	Philprene
PO	Polysar, Krylene, Krymol
SC	S
TU	Synpol
UR	Baytown

AS WORK progressed on the compilation of available rubbers for Section III of the third edition of "Compounding Ingredients for Rubber," it became apparent that a considerable number of changes had been made in the grades offered by SBR suppliers.

It is recognized, of course, that there is nothing final in this list. These changes are continuing at a rapid pace, and this list may be obsolete at the time of publication. It will serve as a continuing basic list for general use, however, as new rubbers are added.

The net increase in total number of grades offered is not too great. This year's total of 160 polymers is only 20 more than last year's 140 grades. Actually, the total number of new polymers added during the year was 47. These included changes in stabilizer, changes in the coagulation systems, greater variety in black, oil-black, and oil masterbatches, and some changes in viscosity. The same period saw 27 grades deleted for being no longer in commercial production. Some, lacking demand, were dropped completely; while others appeared among the new numbers because of slight modifications. The industry trend toward the use of ASTM numbers along with the formal adoption of certain grades into ASTM standards produced the changes in number of 10 previously offered grades.

TABLE 3. AVAILABLE DRY STYRENE-BUTADIENE RUBBERS (SBR)—
UNITED STATES AND CANADA

ASTM No. or Other	MV ¹	Stab. ²	Emul. ²	Coag. ²	Black ²		Oil ²		Producers ²	Description ³
					Type	Amt.	Type	Amt.		
HOT POLYMERIZED TYPES										
1000	44-52	ST	FA	SA	—	—	—	—	FS, GG, PC, SC, TU	Gen.-purpose staining-type hot rubber
Polysar S	47	ST	FA	SA	—	—	—	—	PO	Essentially same as 1000. 28% Bd. Sty.
1001	44-52	SS	FA	SA	—	—	—	—	FS, GG, PC, TU	Less staining than 1000
1002	50-58	ST	RA	SA	—	—	—	—	GG, SC, TU	Same as 1000 except rosin instead of fatty acid soap
1004	46-54	ST	FA	AL	—	—	—	—	AS, FS	1000 coagulated with alum for low water absorption
1006	46-54 ⁴	NS	FA	SA	—	—	—	—	AS, CR, FS, GG, GT, PC, SC, TU	Non-staining, non-discoloring version of 1000
Polysar S-630	47	NS	FA	—	—	—	—	—	PO	Equivalent to 1006. 28% Bd. Sty.
1007	45-55	ST	FA	GA	—	—	—	—	FS, GG, TU	Glue-acid coagulated 1000 for low water solubles
1009	115-135	NS	FA	SA	—	—	—	—	AS, FS, GG, PC, SC, TU	Terpolymer of Bu., Sty., Divinylbenzene. Low shrinkage and swell
Polysar S-X 371	—	NS	FA	GA	—	—	—	—	PO	Equivalent to 1009. 26% Bd. Sty.
1010	25-35	NS	FA	AL	—	—	—	—	FS, PC	Low Mooney viscosity for chemically blown sponge and adhesives
1011	50-58	NS	RA	SA	—	—	—	—	GG, SC	1006 with rosin instead of fatty acid soap
1012	95-115	NS	FA	SA	—	—	—	—	FS, GG, TU	High Mooney viscosity 1006 for high-viscosity cements
1013	40-50	NS	FA	AL	—	—	—	—	FS, GG, SC, TU	Alum coagulated, 42-44% Bd.-Sty., low water solubles
1014	55-85	SS	RA	BAL	—	—	—	—	FS	Good tack and green tensile for adhesives. 40% Bd.Sty.
1016	46-54	ST	FA	GA	—	—	—	—	NC	Glue-acid coagulated for low water absorption. Wire grade
1018	115-135	NS	FA	GA	—	—	—	—	AS, NC, PC	Glue-acid coagulated for low water absorption. Cross-linked. Wire grade
1019	46-54	NS	FA	GA	—	—	—	—	AS, NC, PC	Glue-acid coagulated for low water absorption. Wire grade
1022	70-90	NS	RA	GA	—	—	—	—	NC	Glue-acid coagulated 1014 with higher Mooney viscosity
1023	46-54	ST	FA	GA	—	—	—	—	NC	Low water absorption and for low-temperature service.
1061	44-52	NS	FA	SA	—	—	—	—	TU	13% Bd.Sty. Wire grade
FR-S 181	25-35	NS	FA	—	—	—	—	—	FS	Similar to 1006 but Polygard stabilizer. For light-colored products
FR-S 182	40-50	NS	FA	AL	—	—	—	—	FS	Low Mooney 1006 for chemically blown sponge
FR-S 195	45-55	NS	FA	—	—	—	—	—	FS	43% Bd.Sty.
3014	60-80	NS	RA	SA	—	—	—	—	AS	For high impact plastic
6003	125	NS	FA	GA	—	—	—	—	NC	Similar to 1014, but non-staining antioxidant and narrower Mooney range
6701	25-35	NS	FA	AL	—	—	—	—	PC	For wire, low water absorption. Cross-linked
8000	40-50	NS	FA	SA	—	—	—	—	TU	Non-staining, 25% Bd. Sty. Bd.Sty. 43.5%. For use where flow required

¹ Mooney viscosity, ML-4 min. @ 212° F. of polymer. Underlined values are for compounded stock. Method of reporting varies from ranges to single averages. Where ranges differ between producers, special footnotes indicate these differences.

² Table 1 of abbreviations, spells out codes used for producers, oil and carbon black types, and specific or general descriptions of materials used for coagulation, emulsification, and stabilization.

³ All grades average 23.5% bound styrene unless otherwise noted in this column. Special properties or suggested special product applications indicated when such information was supplied by producers.

⁴ 1006—MV for FS, 45-54; GT, 44-52.

TABLE 3. AVAILABLE DRY STYRENE-BUTADIENE RUBBERS (SBR) (CONTINUED)

ASTM No. or Other	MV ¹	Stab. ²	Emul. ²	Coag. ²	Black ²		Oil ²		Producers ²	Description ³
					Type	Amt.	Type	Amt.		
COLD POLYMERIZED UNPIGMENTED TYPES										
1500	46-58	ST	RA	SA	—	—	—	—	AS, CR, FS, G, GG, PC, SC, TU	Gen.-purpose cold rubber. Bet- ter physical properties than hot varieties
1500C	46-58	ST	RA	SA	—	—	—	—	GT	Differs from 1500 in use of Wing-Stay 100 as stabilizer
Krylene	52	ST	RA	SA	—	—	—	—	PO	Equivalent to 1500
1501	46-58	SS	RA	SA	—	—	—	—	GG	Equivalent to 1500 except less staining
1502	46-58	NS	FA/RA	SA	—	—	—	—	AS, CR, FS, G, GG, GT, PC, SC, TU	Non-staining 1500
1503	46-58	NS	FA	GA	—	—	—	—	AS, NC, PC	Glue-acid coagulated 1500 for low water absorption. Wire grade
Kryflex 200	55	NS	FA	GA	—	—	—	—	PO	Equivalent to 1503. 28% Bd. Sty.
Kryflex 202	61 (MS)	NS	FA/RA	SA	—	—	—	—	PO	High molecular weight polymer
Kryflex 252	—	NS	FA	SA	—	—	—	—	PO	Higher styrene content than normal (44.5%)
Krylene NS	55	NS	FA	SA	—	—	—	—	PO	Similar to 1503 except normal instead of low ash content.
Krylene 602	35	NS	FA	SA	—	—	—	—	PO	28% Bd.Sty.
1504	45-59	NS	FA	GA	—	—	—	—	NC	Similar to Krylene NS, except lower Mooney viscosity. Bd. Sty., 28%
1505-NS	34-46	NS	RA	SA	—	—	—	—	CR	Glue-acid coagulated for low water absorption. Bd.Sty. only 12%. Wire grade
1507	30-40 ⁵	NS	FA/RA	SA	—	—	—	—	AS, CR, GT, SC	Low Bd.Sty. (9%) for low- temperature service
1508	46-58	NS	FA	SA	—	—	—	—	GT	Similar to 1502 except lower Mooney viscosity
1509	30-38	NS	FA/RA	AL	—	—	—	—	SC	Similar to 1507 except AL coagulant
1510	30-35	NS	FA	SA	—	—	—	—	GT	Low Mooney viscosity
1551	46-58	NS	RA	SA	—	—	—	—	TU	Non-staining 1500
3105	31-35	NS	FA/RA	AL	—	—	—	—	AS	Low Mooney viscosity for chemically blown sponge and adhesives
3106	46-56	NS	FA ¹	GA	—	—	—	—	AS	Similar to 1503 without special processing. Slightly higher residual ash content
3110	24-30	NS	FA/RA	AL	—	—	—	—	AS	Similar to 3105 except even lower Mooney viscosity
4600	36-48	NS	FA	SA	—	—	—	—	GG	Similar to 1502 except lower Mooney viscosity and only fatty acid soap used
6100	65-85	ST	RA	GA	—	—	—	—	NC	Similar to 1500 except higher Mooney viscosity and low water absorption
6102	46-58	ST	FA	GA	—	—	—	—	NC	Same as 1503 except staining stabilizer
8101	44	NS	FA	GA	—	—	—	—	TU	Low ash and low water absorp- tion
8103	30-40	NS	FA/RA	SA	—	—	—	—	TU	Similar to 1502, but lower Mooney viscosity
FR-S 146	35-45	NS	FA/RA	SA	—	—	—	—	FS	Low Mooney viscosity for light-colored sponge, me- chanical goods
FR-S 158	—	NS	—	Spec.	—	—	—	—	FS	50 pts. 1502 and 50 pts. high styrene resin
FR-S 179	125	NS	FA/RA	—	—	—	—	—	FS	High Mooney viscosity rubber for oil extension in Banbury

⁵ 1507—MV for CR, 35; GT, 30-35; SC, 30-38.

TABLE 3. AVAILABLE DRY STYRENE-BUTADIENE RUBBERS (SBR) (CONTINUED)

ASTM No. or Other	MV ¹	Stab. ²	Emul. ²	Coag. ²	Black ²		Oil ²		Producers ²	Description ³
					Type	Amt.	Type	Amt.		
COLD POLYMERIZED BLACK MASTERBATCH RUBBER ⁶										
1600	65-80	ST	RA	SA	HAF	50	—	—	SC	1500 plus 50 HAF black
1601	62-74 ⁷	ST	FA/RA	SA ⁷	HAF	50	—	—	PC, UR	1502 plus 50 HAF black, except that a staining stabilizer is used
1602	77-92	ST	FA/RA	SA	HAF	50	—	—	SC	1502 plus 50 HAF black and staining stabilizer
1603	50-65	NS	FA	GA	EPC	50	—	—	PC	Non-staining EPC black masterbatch. Formerly 6611
1604	—	ST	RA	SA	ISAF	60	HA	10	SC	ISAF, 60; 10 of oil. For tread rubber
1605	52-66	NS	FA	GA	FEF	50	—	—	GG, PC	Non-staining FEF black masterbatch from 1503
1606	—	ST	RA	Acid	HAF	52	HA	10	SC	HAF 52; 10 of oil. For tread rubber and mechanicals
1607	52-72	ST	RA	SA	HAF	60	HA	10	SC	1500 with HAF black and oil as processing aid
1608	56	ST	RA	Spec.	ISAF	52	HA	12.5	CR	1500 plus ISAF and oil as processing aid
3750	55	ST	RA	Spec.	HAF	52	HA	10	CR	1500 plus HAF black with oil as processing aid
3754	—	NS	FA/RA	Spec.	FEF	52	N	12.5	CR	1502 plus FEF black masterbatch with oil as processing aid
3762	62	ST	RA	SA	SAF	40	HA	5	CR	1500 plus SAF black masterbatch and oil as processing aid
4651	74	ST	RA	Spec.	HAF	62.5	HPO	12	GG	1500 HAF black masterbatch plus oil as processing aid
4659	—	ST	RA	—	HAF	52	HA	10	GG	1500 plus 52 HAF black, 10 parts oil. For tires and mechanicals
4660	—	ST	RA	—	ISAF	52	HA	10	GG	1500 plus 52 ISAF black, 10 parts oil. For tires and mechanicals
6604	53-70	ST	FA/RA	Acid	SAF	40	HA	5	PC	1502 with 40 phr SAF black and 5 phr HA oil, except staining stabilizer is used
6661	48-60	ST	RA	Acid	HAF	52	HA	10	PC	1500 with 10 phr HA oil and 52 HAF black
6662	49-65	ST	RA	Acid	ISAF	52	HA	12.5	PC	1500 with 12.5 phr HA oil and 52 phr ISAF black
8151	52-64	ST	RA	Acid	HAF	52	HA	10	TU	1500 with 52 phr HAF black and 10 phr oil as processing aid
8152	70-82	ST	RA	Acid	HAF	55	—	—	TU	1500 with 55 phr HAF black
9152	—	ST	RA	Spec.	SAF	40	HA	5	G	SAF black, 40; oil, 5. Used for very abrasive-resistant compounds
9153	—	ST	RA	Spec.	HAF	52	HA	10	G	HAF black, 52; oil, 10. Similar to 9152, but less abrasion resistant
9154	—	ST	RA	Spec.	ISAF	52	HA	12.5	G	ISAF black, 52; oil, 12.5. Displays wear characteristics between 9152 and 9153
B-129	65	NS	FA/RA	Spec.	EPC	50	—	—	UR	1502 plus 50 EPC black
B-134	60	NS	FA	Spec.	FEF	50	—	—	UR	1503 plus 50 FAF black
B-147	52	ST	RA	Spec.	ISAF	50	A	10	UR	1500 plus 50 ISAF black, 10 of oil

⁶ 14 parts or less of oil added are considered a processing aid, not an extender, and therefore such masterbatches are included in this section.

⁷ 1601—UR: MV, 68; coag., spec.

TABLE 3. AVAILABLE DRY STYRENE-BUTADIENE RUBBERS (SBR) (CONTINUED)

ASTM No. or Other	MV ¹	Stab. ²	Emul. ²	Coag. ²	Black ²		Oil ²		Producers ²	Description ³
					Type	Amt.	Type	Amt.		
COLD POLYMERIZED BLACK MASTERBATCH RUBBER (CONTINUED)										
B-165	53	ST	RA	Spec.	HAF	52	HA	10	UR	1500 plus 52 HAF black, 10 of oil
B-169	65	ST	RA	Spec.	SAF	40	HA	5	UR	1500 plus 40 SAF black, 5 of oil
B-170	54	ST	RA	Spec.	SAF	40	HA	10	UR	1500 plus 40 SAF black, 10 of oil
COLD POLYMERIZED OIL-EXTENDED RUBBER										
1703	50-70 ⁸	NS	FA/RA	SA	—	—	N	25	AS, FS, GG, PC, SC, TU	Gen.-purpose non-staining rubber with naphthenic oil
1705	50-65	ST	FA/RA	SA	—	—	A	25	GG	Differs from 1703 in type oil, and easier processing
1707	45-65 ⁹	NS	RA	SA	—	—	N	37.5	GG, SC, TU	Gen.-purpose with rosin for tack
1708	50-70 ¹⁰	NS	FA	GA	—	—	N	37.5	AS, GG, PC, TU	1707 with fatty instead of rosin acid; glue-acid coagulation for low water absorption
1709	45-65	ST	RA	SA	—	—	A	37.5	SC	1707 with aromatic oil
1710	48-62 ¹¹	ST	FA/RA	SA	—	—	A	37.5	FS, GG, SC	1705 with higher oil content
1710C	45-59	ST	FA/RA	SA	—	—	A	37.5	GT	1710 with Wing-Stay 100 as stabilizer
Krynox 651	52	ST	FA/RA	SA	—	—	A	37.5	PO	Equivalent to 1710
1712	45-65 ¹²	ST	FA/RA	SA	—	—	HA	37.5	AS, CR, FS, G, GG, PC, SC, TU	1710 with highly aromatic oil for better processing
1712C	45-59	ST	FA/RA	SA	—	—	HA	37.5	GT	1712 with Wing-Stay 100 as stabilizer
1713	44-60 ¹³	NS	FA/RA	SA	—	—	N	50	AS, CR, GT	Gen.-purpose high oil content for light-colored products
1714	52	ST	FA/RA	SA	—	—	HA	50	CR	High oil content, general-purpose use
1714C	45-55	ST	FA/RA	SA	—	—	HA	50	GT	High oil content with maximum polymer protection. Wing-Stay 100 stabilizer
1773	53-67 ¹⁴	NS	FA/RA	SA	—	—	N	25	CR, GT	1703 with light oil for light-colored goods
1778	48-72 ¹⁵	NS	FA/RA	SA	—	—	N	37.5	CR, G, GT, SC	1707 with mixed acids and light-colored oil
Krynox 652	52	NS	FA/RA	SA	—	—	N	37.5	PO	Equivalent to 1778
3700	45-60	ST	FA/RA	SA	—	—	HA	50	CR	1712 with higher oil content
3900	62	NS	FA/RA	SA	—	—	Rosin	25	CR	Rosin for superior physical properties and improved tack
4700	55	NS	FA	GA	—	—	N	50	GG	1708 with higher oil content
7701	47-57	ST	FA/RA	SA	—	—	A	31	SC	Intermediate oil content
8200	56	NS	FA	GA	—	—	N	37.5	TU	Extremely light-colored with low ash content
8201	50-62	NS	FA	GA	—	—	N	50	TU	1708 with higher oil content and low ash content
8202	43-55	ST	FA/RA	SA	—	—	HA	50	TU	High oil content rubber
8208	51	NS	FA	GA	—	—	N	50	TU	High oil content rubber
FR-S 173	53-67	NS	FA/RA	SA	—	—	N-NS	25	FS	For light-colored goods
FR-S 178	48-62	NS	FA/RA	SA	—	—	N-NS	37.5	FS	FR-S 173 with higher oil content
FR-S 184	40-50	ST	FA/RA	—	—	—	A	37.5	FS	1710 specially stabilized
FR-S 201	48-62	NS	FA/RA	—	—	—	N	50	FS	FR-S 178 with added oil
Polymer G	40-60	NS	FA/RA	SA	—	—	Not available		G	For low-temperature service. Oil content not disclosed

⁸ 1703—MV for FS, 53-67; GG, 50-65; GT, 50-64; PC, 47-64.⁹ 1707—MV for GG, 50-65.¹⁰ 1708—MV for GG, 50-65; PC, 47-64.¹¹ 1710—MV for GG, 50-65.¹² 1712—MV for CR, GG, 45-60; FS, 48-62; PC, 44-58.¹³ 1713—MV for CR, 51; GT, 45-55.¹⁴ 1773—MV for CR, 53.5 (typical).¹⁵ 1778—MV for CR, 45-60; SC, 45-65.

TABLE 3. AVAILABLE DRY STYRENE-BUTADIENE RUBBERS (SBR) (CONTINUED)

ASTM No. or Other	MV ¹	Stab. ²	Emul. ²	Coag. ²	Black ²		Oil ²		Producers ²	Description ³
					Type	Amt.	Type	Amt.		
COLD POLYMERIZED OIL AND BLACK EXTENDED RUBBERS										
1800	—	ST	FA/RA	SA	ISAF	82.5	HA	51.3	SC	ISAF, 82.5; oil, 51.3. For treads
1801	65	ST	FA/RA	Spec.	HAF	50	N	25	UR	1703 with black
1802	—	ST	FA/RA	SA	HAF	82.5	HA	56.8	SC	HAF, 82.5; oil, 56.8. For tread rubber and mechanicals
1803	55-70 ¹⁶	ST	FA/RA	SA	HAF	50	HA	25	PC, SC, UR	1705 with HAF black
1805	45-60 ¹⁷	NS	FA	Acid	HAF	75	N	37.5	GG, PC	1708 with HAF black
1806	—	NS	RA	SA	FEF	60	N	37.5	SC	FEF, 60; oil, 37.5. For NS stock with FEF black
1807	—	ST	RA	SA	ISAF	75	A	37.5	SC	ISAF, 75; oil, 37.5. For high- quality tread rubber
1808	—	ST	FA/RA	Acid	HAF	75	HA	50	SC	HAF, 75; HA oil 50. For economy-grade tread rubber
1809	62	ST	FA/RA	Spec.	HAF	75	HA	37.5	GG	1712 with HAF black
1810	57	NS	FA	Spec.	FEF	100	N	50	GG	FEF, 100; oil, 50
1811	—	ST	RA	Spec.	SRF	75	HA	17.5	CR	1500 with SRF black and oil for processing aid
1813	63	ST	FA/RA	Spec.	ISAF	60	HA	37.5	CR	1712 with ISAF black
1814	—	ST	FA/RA	Spec.	ISAF	75	HA	50 ¹⁸	CR	1712 with ISAF black and 12.5 added oil
1815	45	NS	FA/RA	Spec.	HAF	75	N	50 ¹⁸	CR	1778 with 12.5 phr N oil added as processing aid
3751	65	ST	FA/RA	Spec.	HAF	75	HA	37.5	CR	1712 with HAF black
3755	—	NS	FA/RA	Spec.	FEF	75	N	50	CR	1778 with FEF black and 12.5 added oil
3757	52	ST	FA/RA	Spec.	HAF	75	HA	50 ¹⁸	CR	1712 with HAF black and 12.5 added oil
3759	61	ST	FA/RA	Spec.	ISAF	60	A	37.5	CR	1712 with ISAF black
3763	54	ST	FA/RA	SA	SAF	55	HA	45 ¹⁹	CR	1712 with SAF black
3764	58	ST	FA/RA	SA	ISAF ²⁰	60	A	37.5	CR	1712 with ISAF black
4753	50	ST	FA/RA	Spec.	HAF	75	HA	50	GG	HAF, 75; oil, 50. For camel- back and some mechanicals
4759	—	ST	FA/RA	—	ISAF	75	A	37.5	GG	ISAF, 75; A oil, 37.5
4760	—	NS	FA/RA	—	SRF	75	N	17.5	GG	SRF, 75; N oil, 17.5
4761	—	ST	FA/RA	—	SAF	65	A	37.5	GG	SAF, 65; A oil, 47.5
6651	50-70	ST	FA/RA	Acid	ISAF	75	HA	50 ¹⁸	PC	1712 with 12.5 phr HA oil and 75 phr ISAF black
6682	47-59	ST	FA/RA	Acid	HAF	75	HA	50 ¹⁸	PC	1712 with 12.5 phr HA oil* and 75 phr HAF black
8253	50.5	NS	RA	Acid	FEF	60	N	37.5	TU	1708 with FEF black
8254	67	ST	FA/RA	Acid	HAF	75	HA	37.5	TU	HAF, 75; oil, 37.5
8255	54	ST	FA/RA	Acid	HAF	75	HA	50	TU	1712 with HAF black
8259	54.5	ST	FA/RA	Acid	ISAF	75	HA	50	TU	8202 with 75 phr ISAF black
8266	55-70	ST	RA	Acid	ISAF	75	HA	37.5	TU	1711 with ISAF black
8267	45-55	ST	RA	Acid	ISAF	60	HA	37.5	TU	1711 With ISAF black
9250	—	ST	FA/RA	Spec.	ISAF	70	HA	45	G	ISAF, 70; oil, 45. For treads
9251	—	ST	FA/RA	Spec.	ISAF	60	HA	37.5	G	ISAF, 60; oil, 37.5. For tread
9252	—	ST	FA/RA	SA	SAF	55	HA	45	G	1712 with SAF black and added oil. For soft-ride treads
9254	—	ST	FA/RA	SA	HAF	75	HA	50	G	1712 with HAF black and added oil. For tread rubber and mechanical goods
9275	—	ST	FA/RA	Spec.	HAF	75	HA	45 ¹⁹	G	1712 with HAF black and 7.5 added oil. For tread rubber
B-111	59	ST	FA/RA	Spec.	HAF	75	A	37.5	UR	1710 plus HAF, 75
B-119	43	NS	FA/RA	Spec.	HAF	50	N	37.5	UR	1778 plus HAF, 50
B-132	54	NS	FA/RA	Spec.	FAF	68.75	N	37.5	UR	1778 plus FEF, 68.75
B-142	57	NS	RA	Spec.	FAF	80	N	37.5	UR	1707 plus FAF, 80
B-151	50	NS	FA/RA	Spec.	HAF	75	N	37.5	UR	1778 plus HAF, 75
B-159	54	ST	FA/RA	Spec.	HAF	75	A	50 ¹⁸	UR	1710 plus HAF, 75; 12.5 extra oil
B-160	43	ST	FA/RA	Spec.	SRF	75	HA	17.5	UR	1500 plus 75 SRF black, 17.5 HA oil

¹⁶ 1803—MV for UR, 65; coag., spec.¹⁷ 1805—MV for GG, 57. Also has special coagulation.¹⁸ Oil considered to be 37.5 parts as extender for base polymer and 12.5 parts as processing aid.¹⁹ Oil considered to be 37.5 parts as extender and 7.5 parts as processing aid.²⁰ This ISAF grade is designated as the new low-structure type.

meetings and reports

Committee D-11, ASTM,

Atlantic City Meeting Has Program Of Papers, Much Committee Activity

Committee D-11 on Rubber and Rubber-Like Materials of the American Society for Testing Materials met on July 1 at Chalfonte-Haddon Hall Hotel in Atlantic City, N. J. This meeting was preceded by meetings of D-11 subcommittees, and there was a special meeting on June 30 at which John W. Born, of the B. F. Goodrich Co. Research Center, and L. B. Bangs, of the Research Division of the Goodyear Tire & Rubber Co., presented papers on the effects of nuclear radiation on rubber. The Committee D-11 dinner was held on the evening of June 30, and the advisory committee met on June 29.

D-11 Meeting

A paper, "Dynamic Testing of Rubber Products Using a Sinusoidal Strain Machine," by A. R. Payne, Research Association of British Rubber Manufacturers, was presented on July 1, preceding the regular meeting of Committee D-11. H. G. Bimmerman, E. I. du Pont de Nemours & Co., Inc., vice chairman of D-11 and chairman of its program committee, introduced Mr. Payne.

The speaker first discussed the principles underlying the development of the RABRM sinusoidal strain dynamic tester and the commercial development of this machine by H. W. Wallace, Croydon, England. The machine is currently being marketed in the United States by Testing Machines, Inc., and was on view at the ASTM Exhibit of Testing and Scientific Apparatus and Laboratory Supplies at Atlantic City. The new machine imposes a forced sinusoidal strain on a rubber specimen and measures the resulting stress and is capable of determining the dynamic properties over a wide range of strain, frequency, and temperature. Both standard specimens and full-size components can be handled on this machine, and it can be used also to simulate practical conditions in testing full-size rubber components.



A. R. Payne

Mr. Payne discussed how the instrument could be used to determine the elastic and viscous properties of rubber over a frequency and temperature range and in some cases to provide master curves by use of the time-temperature superposition principle. He discussed also the effects of compounding on the dynamic properties of rubber.

The speaker explained the enormous changes that occur in both dynamic loss and modulus parameters of rubbers containing fillers such as carbon black with strain. He showed that the greatest changes occur between about 0.1 and 10% strain, a range in which most rubber products are used. This behavior was shown to be thixotropic in nature and to be described by equations analogous to those used by rheologists to describe non-Newtonian behavior of two components systems. The importance of this behavior in relation to the strains to which rubber is normally subjected to in service and how the above-mentioned changes could be interpreted in

terms of weak and strong bonds as well as that of the hydrodynamic interference of filler particles, when the rubber is stressed, were explained also.

The importance of hysteresis as a parameter in the heat buildup, tear, and abrasion resistance of rubber vulcanizates was discussed.

Following the presentation of the paper by Mr. Payne, the regular meeting of Committee D-11 was held. Simon Collier, consultant, chairman of D-11, presided with the assistance of J. J. Allen, Firestone Tire & Rubber Co., D-11 secretary.

Mr. Collier thanked Mr. Bimmerman for the program of papers presented both on the morning of June 30 and on the morning of July 1.

It was announced that the D-11 fund now amounted to about \$2,500 and that the annual request for donations would be continued until the fund total reached \$5,000.

Most of the items on the recent May, 1960, letter-ballot of D-11 were approved. The Specifications for Rubber Rings for Asbestos Cement Pipe, however received five negative votes and was referred back to subcommittee 6 for further work.

The advisory committee actions on several items were reported and approved by the members of D-11. The advisory committee indicated its approval of the formation of the new Joint D-11/D-20 Task Group on Definitions, the purpose of which is to deal with matters in this field where conflicts arise between Committees D-11 on Rubber and D-20 on Plastics and recommended that this joint task group be maintained on a permanent basis. Approval of the action of this joint task group in recommending the submission of the revised definitions for "rubber, rubber-like, and rubber products" of subcommittee 8 of D-11 to the administrative committee on standards for adoption was indicated also.

The formation of a joint section with subcommittee 16F of Committee D-20



L. B. Bangs

on the development of specifications for solid urethane rubbers and plastics was opposed until such time as a specific problem arises. In event of the acceptance of the new definition for "rubber," D-11 reserved the right to jurisdiction over urethane rubbers.

The change in the name of subcommittee 22 from "Cellular Rubbers" to "Flexible Cellular Materials" was approved.

The resignations of K. F. Cullison, B. F. Goodrich Co., as chairman of subcommittee 3 on Tests of Thread Rubber, and of H. H. Irvin, Marbon Chemical, Division of Borg-Warner Corp., as chairman of subcommittee 19 on Adhesion Tests, were accepted with regret. P. J. Larsen, Lord Mfg. Co., was appointed chairman of subcommittee 19.

The consolidation of subcommittees 19 and 20, as proposed at the last D-11 meeting is to be reconsidered.

L. V. Cooper, Firestone, chairman of the nominating committee, announced the following slate of officers for D-11 for the next two years: chairman, Mr. Collier; vice chairman, Mr. Bimmerman; and secretary, Mr. Allen. New members nominated for the advisory committee were A. E. Juve, Goodrich Research Center, and B. S. Garvey, Pennsalt Chemicals Corp. All nominations were approved unanimously. It was mentioned that for the first time in years the name of A. W. Carpenter, former secretary of D-11, was not on the ballot.

The term of Mr. Juve as a director of ASTM expired on June 30, but D-11 will be represented on the board of directors by virtue of the election of Mr. Cooper as Juve's successor.

The Synthetic Organic Chemical Manufacturers Association is sponsoring a glossary of names of industrial organic chemicals and has asked for a representative from D-11 in connection with names for elastomers and rubber processing chemicals. R. G. Seaman,

RUBBER WORLD, chairman of subcommittee 8 on nomenclature and definitions, was named to attend a meeting of the SOCMA committee on July 7, in New York, N. Y.

R. E. Hess, associate executive secretary of ASTM, has received a letter suggesting that Committee D-11 undertake work on test methods and specifications for pigments in addition to carbon black. Committee D-11's position is that such work should be assigned to Committee D-24 on Carbon Black, and the scope of that committee expanded. D-11 is interested in such work on pigments only when it involves tests in rubber.

Because of the number of D-11 subcommittee meetings during the two days scheduled for such meetings, a very crowded schedule results. In connection with the suggestion that more time be allowed for such meetings, the secretary of D-11 will send out a questionnaire to the members of D-11 to determine what changes, if any, might be recommended.

Nuclear Radiation Effects

Mr. Bimmerman presided also at the special meeting on the morning of June 29 at which the papers on effects of nuclear radiation on rubbers were presented by Born and Bangs.

"Good and Bad Effects of Nuclear Radiation on Rubber" was the title of the paper by J. W. Born. This speaker explained that neutron and gamma radiations cause ionization and excitation in elastomers, resulting in cross-linking, chain scission, and molecular rearrangement. The general net effect is that either cross-linking or chain scission predominates. Whether the result is good or bad depends on the state of the elastomer, its initial degree of cross-linking or polymerization, its inherent radiation stability, and its chemical and physical environment, it was said.

The beneficial effects include polymerization, graft copolymerization, vulcanization, and post-vulcanization. Although in principle all four processes can be achieved equally well and more economically by chemical means, radiation induction has certain advantages. For example, no search is required for the proper chemical agents and conditions; no heating is necessary; and no chemical residues remain to cause undesirable later reactions when radiation is used. Also, more nearly uniform vulcanization of thick rubber objects can readily be achieved.

Assuming a rubber has an optimum degree of cross-linking or vulcanization, any radiation-induced change in such polymer structure is a bad effect, this speaker said. Detrimental radiation effects include overvulcanization (cross-linking), degradation (chain scission), accelerated oxidation and ozonization, unsaturation, and molecular rearrange-



J. W. Born

ment. Two methods of inhibiting radiation damage are being pursued and show promise: namely, physical addition of special inhibitors to rubber compounds and the synthesis of elastomers containing inhibiting groups.

Typical examples of radiation-induced changes in physical properties were illustrated for various rubbers.

"The Factor of Ozone Generation in Tests of Radiation Damage to Elastomers" was the subject of the paper by L. B. Bangs, which had as its objective an attempt to show the extent to which ozone is generated by radiation, and how the generation of ozone is important in the radiation degradation of elastomers.

Ozone is produced by the irradiation of air, and the concentration of ozone increases until an equilibrium is established between generation and decay rates. The equilibrium concentration is sensitive to variations of temperature and pressure and is considerably higher than the concentrations encountered in accelerated aging tests, it was said. The effect of this ozone concentration on radiation degradation data for polymers cannot therefore be neglected.

Ozone attacks the double bond in unsaturated polymers. Reaction products typical of ozone attack have been detected and isolated in irradiated natural rubber. Ozone generation may presumably occur from internal (dissolved or adsorbed oxygen) or external oxygen sources. External ozone attack may be controlled by conducting irradiation studies in an inert atmosphere. Control of internal ozone generation depends upon the removal of dissolved or adsorbed oxygen prior to irradiation of the elastomer, Mr. Bangs explained.

Ozone attack may or may not constitute the principal mechanism of radiation degradation for polymers, but the contribution which such attacks make cannot be ignored, it was concluded.

Subcommittee Reports

Subcommittee 5—Wire and Cable. John T. Blake, Simplex Wire & Cable Co., chairman. The subcommittee voted to overrule the negative votes on three items on the recent Committee D-11 letter-ballot.

It was voted also to ask the specifications section to study all specifications under the jurisdiction of subcommittee 5 with the objective of standardizing and reducing the number of aging and other requirements in these specifications. This section was asked also to study the problem of measuring the insulation resistance of the newer polyethylene where the present methods are not considered sufficiently sensitive.

It is expected that the specification for silicone rubber insulation will be ready for the next subcommittee meeting.

Subcommittee 6—Packings. R. F. Anderson, B.F. Goodrich Co., chairman. The five negative votes on the recent D-11 letter-ballot on the Proposed Tentative Specification for Rubber Rings for Asbestos Cement Pipe were discussed, and agreement was reached on the following changes and future plans: (1) The hardness values will remain as given in the original proposal. (2) Modulus values will not be changed, but the method of preparing the specimen was returned to the task group for revision. (3) The tension set test will be deleted from the method. (4) The specification for the stretch test was returned to the task group for review and consideration of raising the value from 50 to 100%. (5) The specification for weight increase in water will be deleted. (6) The oven-aging requirement was referred back to the task group for review of the aging period requirement and the method of test. (7) Hardness testing of the rings was referred back to the task group for further consideration, with special reference to the development of a low-temperature method. (8) The task group will also consider a revised procedure for the compression set requirement.

Section X of the joint ASTM-SAE Committee on Automotive Rubber has requested the following changes in D 1147-59T, Compressibility and Recovery of Gasket Materials: (1) Revise paragraph 2(c) to specify that thickness readings be estimated to the nearest 0.0001-inch. (2) Add a column to Table I to show psi. loadings on the specimen. (3) Bring the specimen-conditioning requirements in complete conformity with those in D 1170-59T, Spec. for Non-Metallic Gasket Materials for General Automotive and Aeronautical Purposes. The request will be acted upon at the next meeting of the subcommittee and in time for the next printing of D 1147-59T.

R. D. Stiehler, National Bureau of Standards, reported on developments since the submission of subcommittee 6's comments on ISO/TC 45 Document

497, "Draft Proposal for Natural Rubber Rings for Joints in Water Piping."

The chairman of subcommittee 6 reported on a survey of the O-ring industry on the interest in developing test methods for such items at high temperatures and in the presence of gases and liquids. Interest is limited almost entirely to governmental agencies, and it was decided that no program would be undertaken at the present time.

Subcommittee 7—Rubber Latexes. G. H. Barnes, Goodyear Tire & Rubber Co., chairman. Analytical methods for the determination of manganese, copper, nitrogen, and iron were discussed with W. P. Tyler, B. F. Goodrich Research Center, and Dr. Stiehler, and a separate meeting was arranged with these two men to determine if the methods would apply to both crude rubber and latex. Methods for the determination of latex preservatives such as boric acid, pentachlorophenol, and zinc dimethylthiocarbamate will be discussed also.

ISO/TC 45 Document No. 531 on Volatile Fatty Acid Number will be approved by the subcommittee after the editorial correction on indicators is made by Dr. Stiehler. ISO/TC 45 Document No. 529 on Coagulum was approved. ISO/TC 45 Document 540 on Density also was approved. It will be proposed by letter-ballot that the density method be extended to cover latices up to 70% total solids instead of the present 63%. If approved, the change will be proposed to ISO/TC 45. Method B of this Document will be eliminated, subject to letter-ballot.

The method for sludge determination in D 1076-59, Spec. and Method of Test for Concentrated, Ammonia Preserved, Creamed and Centrifuged Natural Rubber Latex, will be rewritten by Dr. Stiehler to express the requirements for a centrifuge in relative centrifugal force (RCF).



New York Times

Simon Collier, D-11 chairman

The present capillary tube method for the determination of latex viscosity is not widely used in the industry according to a recent survey; the Brookfield Engineering Laboratories LVF machine is preferred. A task group was established to investigate this situation.

A task group was established also to determine the value of the zinc oxide stability test (BSI 9837).

Another task group has been established to ascertain the pH at the time of the color change of the methyl red indicator in the test for latex alkalinity. At present a pH of 5.2 is used, but indications are that the value should be closer to a pH of 6.0.

Subcommittee 8—Nomenclature and Definitions. R. G. Seaman, RUBBER WORLD, chairman. H. G. Bimmerman, E. I. du Pont de Nemours & Co., Inc. chairman of task group 1, reported on test data obtained on 22 different rubber and plastic materials in an attempt to develop a suitable quantitative definition for "rubber." Data were obtained for brittle point, rebound, compression set, hardness, stress-strain, and extension retraction at both room and other temperatures in many instances.

The extension-retraction test at room temperature outlined in the definition for rubber in the D-11 letter-ballot of August, 1959, which received three negative votes at that time, appeared to be the best method for separating rubbers from plastics, with rebound at room temperature another possibility. Two of the negative votes were resolved before the Atlantic City meeting, and the remaining negative vote, which involved a change in the requirement for % set from 10 to 50 after stretching the sample to 100% and measuring set five minutes after release, was withdrawn.

Subcommittee 8, now that all the negative votes were resolved, voted to submit this definition for rubber after some minor editorial changes, together with the definitions for rubber-like and rubber products, also with minor editorial changes, to Committee D-11 with the request that they be forwarded to the administrative committee on standards for inclusion in D 1566-58T, Tentative Definition of Terms Relating to Rubber and Rubber-Like Materials.

These definitions have the approval also of the new Joint D-11/D-20 Task Group on Definitions headed by R. E. Hess, associate executive secretary, after a discussion held at Atlantic City on June 28. It was suggested, however, that additional work be done by subcommittee 8 with special reference to the further development and refinement of the definition for rubber-like materials.

Subcommittee 8 instructed its task group 1 to study further the matter of the degree of set after the extension-retraction test being used to classify rubber and to study the wording of all three definitions for possible improvement. The task group will return also

to the study of terms in the "Glossary of Terms Relating to Rubber and Rubber-Like Materials," ASTM Publication No. 184, for inclusion of those terms of greatest interest in Committee D-11 work into D 1566-58T. Any problems that cannot be resolved in subcommittee 8 will now be referred to the D-11/D-20 joint task group on definitions.

Dr. Stiehler, chairman of task group 2, gave a progress report on abbreviations for the "M" or polymethylene family of elastomers in D 1418-58T, Tentative Recommended Practice for Nomenclature for Synthetic Elastomers and Latices. Agreement on the abbreviations for polyisobutene and copolymers of ethylene and propylene was achieved, but further work will be required on four other elastomers of this family before a recommendation can be made.

Action in the Joint D-11/D-20 Task Group on Definitions resulted in the decision to remove the abbreviations for polybutadiene-acrylonitrile (PBAN), polychloroprene (PC), and polyisobutylene-isoprene (PIBI) from D 1600-58T, Tentative Abbreviations of Terms Relating to Plastics, which eliminates the conflict with D 1418-58T.

Subcommittee 9—Insulating Tape. W. H. Meade, Boston Edison Co., chairman. In connection with the proposed specification for moisture-resistant rubber tape, it was decided that a specification for butyl rubber tape including requirements for moisture as well as heat resistance, would best meet the requirements of the industry. The specification section was instructed to prepare a proposed specification with test methods and submit it at the next meeting of the subcommittee, if possible.

Editorial changes suggested for existing specifications will be considered and reported on at the next meeting.

Subcommittee 10—Physical Testing L. V. Cooper, Firestone Tire & Rubber Co., chairman. As a result of action taken at the last meeting of the subcommittee in Chicago on the methods for determining the tear resistance of elastomeric materials, A. G. Veith, B. F. Goodrich Co. Research Center, reported on work done at the British Rubber Producers Research Association, and W. E. Scoville, Jr., Boston Woven Hose & Rubber Division, American Bilrite Rubber Co., reported on the results of a questionnaire circulated among the members of subcommittee 10 on tear test practices. It was decided to conduct an inter-laboratory test program on tear testing methods to include an evaluation of the "trousers" tear test specimen.

D. C. Scott, Jr., Scott Testers, Inc., gave a progress report on the work being done on the calibration of tensile testing machines by his task group of Committee E-1 on Methods of Testing. No action by subcommittee 10 was requested, but comments on the proposed



H. G. Bimmerman, D-11 vice chairman

method were solicited. The method will be considered by Committee E-1; then subcommittee 10 will have an opportunity to review it.

R. G. Spain, Wyandotte Chemicals Corp., reported on a method used by this company to determine the stress-strain properties of elastomers at elevated temperatures. A tentative method for stress-strain testing at elevated temperatures, which is based largely on D 412-51T, Tension Testing of Vulcanized Rubber, was circulated. The chairman of subcommittee 10 was authorized to appoint a task group to review the proposed method and report to him before it is circulated for subcommittee letter-ballot. It was voted also to ask the original task group to proceed with inter-laboratory testing using the proposed method.

F. L. Roth, NBS, offered a revision of D 412-51T to include the use of strain gages in tensile testing. A task group will be appointed to review this matter and report to the subcommittee chairman before submitting it to subcommittee letter-ballot.

W. H. King, Acushnet Process Co., reported on differences in original deflection specified in D 395-55, Compression Set of Vulcanized Rubber, and the ISO/TC 45 method. An inter-laboratory test program was agreed upon, and a task group headed by Mr. King was appointed to carry out the work.

In connection with D 1415-56T, Method of Test for International Standard Hardness of Vulcanized Natural and Synthetic Rubbers, ISO TC 45 is considering a draft method which specifies a pellet about one-half the size of that required in D 1415-56T. Since this modification would produce a useful method for determining the hardness of thin pieces, Dr. Stiehler was appointed to investigate the matter of pellet size and report at the next meeting of the subcommittee.

A revised procedure for curing buttons for the compression set test, D 395-55, did not get on the last letter-ballot, but will be letter-balloted in subcommittee 10.

The subcommittee chairman was empowered to make an editorial change in D 412-51T, pointing out that the cardboard used in cutting tensile specimens should be moved between cuts so that succeeding cuts are made on unused surfaces.

Subcommittee 11—Chemical Analysis of Rubber Products. W. P. Tyler, Goodrich Research Center, chairman. The proposed method of test for the color of raw SBR was submitted to subcommittee 11 for advisory approval by subcommittee 13.

Final editorial changes in the D-11 approved revision of D 297-59T, Methods of Chemical Analysis of Rubber Products, were made.

Discussion of changes made in D 1278-58T, Methods of Chemical Analysis of Natural Rubber, at the request of subcommittee 12 resulted in essentially final form for the copper, manganese, and iron determinations plus some immediate changes in the procedure for rubber hydrocarbon. The revisions will be submitted to subcommittee 12 for further action.

A method for determination of nitrogen in crude rubber or in latex with alternative procedures will be submitted for subcommittee discussion and ballot. The method chosen should be suitable for ASTM and for proposal as an ISO/TC 45 method.

Testing programs on the determination of IIR (butyl rubber) and bound styrene in SBR will be resumed with revised methods.

Brief discussion was held on possible methods for the determination of boric acid, pentochlorophenol or di-thiocarbamate in natural rubber latex.

Subcommittee 12 — Crude Natural Rubber. L. G. Mason, B. F. Goodrich Co., chairman. Dr. Tyler, chairman of subcommittee 11, submitted a report on proposed revisions in D 1278-58T in connection with copper, manganese, iron, and ash (when it refers to copper, manganese, and iron determinations) and rubber hydrocarbon determinations. As soon as the proposed revised portions of D 1278-58T are finalized by Dr. Tyler, they will be letter-balloted in subcommittee 12. Dr. Tyler will also handle any of these changes which seems to be critical, and ISO/TC 45 is copper and manganese procedures.

The sample preparation procedure for the rubber hydrocarbon analysis appears to be critical, and ISO/TC 45 is now considering this problem. Dr. Tyler reported that he recently tested samples from Dr. Wake, of the British Rubber Producers Research Association, of extracted, dried natural rubber, which had been sheeted on even- and on odd-speed mills and obtained good

check results by both methods of sample preparation. Overmilling on the odd-speed mill, however, results in lower values.

In connection with the request that he submit a suitable method for the determination of nitrogen in crude natural rubber, Dr. Tyler asked whether this should be a semi-micro or macro Kjeldahl method. Since no definite preference was expressed, it was suggested that both methods be included and that at least one of them conform to that finally adopted by ISO/TC 45, if possible.

Development of faster methods of test for crude natural rubber than those in D 1278-58T will be accelerated under the new chairman of the task group on methods of test, I. D. Patterson, Goodyear. Infrared heating tests to replace the present copper, manganese, and iron determinations showed poor correlation in previous work by R. Knill, Goodyear. X-ray fluorescence methods for copper and manganese are still to be investigated, and polarographic methods for copper, manganese, and iron are also to be checked.

Dr. Stiehler, chairman, American group for ISO/TC 45, reported on ISO/TC 45 Draft Recommendations Nos. 340 through 344, to the ISO General Secretariat, as follows:

No. 340 on Ash in Raw Natural Rubber. Editorial changes on sampling and homogenizing of the rubber tested were suggested as recommended by Dr. Tyler. Also in Method B, change "about 3/4 of an hour" to "one hour."

No. 341 on Volatile Matter. Editorial changes involving revision under Procedure requiring that samples that cannot be immediately weighed be placed into an airtight container or wrapped in polyethylene to conserve their moisture content, were recommended.

No. 342 on Dirt Content. This Draft Recommendation was approved as presented.

No. 343 on Rubber Hydrocarbon. Approval was not recommended because of desired apparatus changes, aeration procedure changes, and need of more detailed instructions in the handling and preparation of the test portion to insure complete oxidation.

No. 344 on Sampling of Raw Natural Rubber. Editorial addition of phrase to require placing sample in airtight container or wrapping in polyethylene in sections 4 (b) and 5.

The recommendations for Nos. 341, 342, and 344 result from work by subcommittee 12, the recommendations for Nos. 340 and 343, from review by Dr. Tyler.

The ISO/TC 45 program to test the physical properties of seven commercial grades of natural rubber with cure rates ranging from very slow to very fast and the NBS No. 385 standard sample of natural rubber in about 25 laboratories around the world is about to get under way. Samples of the rubbers, compounding ingredients, and in-

structions for testing are packed and ready for shipment from the NBS. The purpose of this project is to determine if good correlation can be obtained in physical testing of known standard samples of rubber. Mooney viscosity determinations on butyl rubber and vulcanization characteristics of compounded natural rubber samples to be furnished will also be run. The final report on this project is scheduled for the ISO/TC 45 meeting in Milan, Italy, in 1961.

A letter from J. LeBras, Institute Francais du Caoutchouc, stated that there would be a delay in forwarding samples of the new C57 and F58 types of natural rubber, but that samples of a rubber similar to C57 will be available shortly, and Dr. LeBras would appreciate tests on this rubber by members of subcommittee 10 in order to gain a knowledge of the values and limits that may be obtained and to aid the orientation of research on other specific types desired by consumers.

H. C. Bugbee, president, Natural Rubber Bureau, and Ralph Wolf, the new director of technical services in the United States for the Malayan natural rubber producers, were present, and Mr. Wolf explained the development of the new program to provide improved liaison between American rubber technologists and the BRPRA and the Rubber Research Institute of Malaya. A new mailing list in the United States for technical information in addition to the *Natural Rubber News* will be completed shortly, and emphasis will be placed on acquainting U. S. consumers with new natural rubber types such as SP, PA-80, non-crystallizing, etc. Facilities for the production of PA-80 are being expanded, and increased availability will be realized in the near future. Amounts larger than a bale can be secured through rubber brokers, and smaller amounts through the NRB.

It was pointed out that Sir Geoffrey Clay, Malayan rubber research coordinator is placing great emphasis on maintaining the reputation for quality of Malayan rubber, and the RRIM welcomes any complaints on quality as long as the rubber is Malayan.

Comments by the Crude Rubber Committee of The Rubber Manufacturers Association, Inc., on an editorial in the March, 1960, issue of *RUBBER WORLD* in which it was suggested that the technical approach to natural rubber specifications should become a part of the September, 1960, Singapore Conference on the International Natural Rubber Type Descriptions or the Green Book, were called to the attention of the subcommittee by our liaison representative to the RMA, C. J. Glaser. The RMA position was that even if technical specifications for natural rubber were developed, their use within present trade practices would be completely impractical; therefore no discussion at the Singapore Conference was desirable.

Subcommittee 13 — Synthetic Elastomers. B. S. Garvey, Jr., Pennsalt Chemicals Corp., chairman. L. G. Mason, chairman of task group No. 1 on sampling, reported on the status of the development of procedures for sampling black masterbatch rubber for moisture or volatile matter. An instrument for use in process control testing down to a moisture content of 1% is available. A method for the determination of less than 1% moisture in black masterbatch is being sought.

ASTM D 1416-58T, Methods for Chemical Analysis of Synthetic Elastomers, will continue as a tentative method since no approval for advancement to standard has been voted by subcommittee 13. The 1960 Preprint Report of Committee D-11 will be corrected on this item.

E. J. O'Connor, Goodrich-Gulf Chemicals, Inc., chairman of task group 2 on chemical tests of synthetic elastomers, reported on a cooperative testing program among 12 laboratories on methods for the estimation of oil content in oil masterbatches. It was voted to submit two alternate methods for letter-ballot in Committee D-11 with addition of the following note: "Although repeatability and reproducibility of the two alternate methods are good, accuracy may vary if production conditions differ from those used in determination of the constants supplied with these methods."

Mr. O'Connor reported also on a cooperative testing program between three laboratories on a method for the evaluation of the color of raw polymers. Although repeatability was 10, and reproducibility was 11, the accuracy of the method was considered to be better than indicated, and it was voted to submit the method to the chairman of subcommittee 11 for review and then to subcommittee 13 members for letter-ballot for addition to D 1416-58T.

P. M. Linger, Texas-U. S. Chemical Corp., chairman of task group 3 on physical tests, reported on a cooperative test program among 13 laboratories on test recipes with 50 phr. of HAF black in SBR 1500, 1502, 1712, and 1713. Since the results from two of the laboratories had just been received, conclusions were not yet available on this program. The results will be thoroughly examined before the task group recommends future work or adoption of the recipes. NBS certified materials will continue to be standard for such test formulations.

The following editorial revisions of Table II of D 1419-60T, Recommended Practice for Description of Types of Styrene-Butadiene Rubbers (SBR) and Butadiene Rubbers (BR), were approved: (1) Column headings for black and oil contents will both be shown in phr. instead of % in one case and phr. in the other. (2) SBR 1606 will show 52 phr. of HAF black. (3) Under "Nominal Temperature," 43° F. will

be used for cold rubbers. (4) New code numbers, as issued, will be forwarded to the SBR plants.

It was voted to letter-ballot in subcommittee 13 the addition of the proposed Table III to D 1419-60T on the types of oils used, as follows:

HI-AR = Highly Aromatic	Max. 20% Saturates
AR = Aromatic	20%-35% Saturates
SA = Saturated	35% Min. Saturates
HI-SA = Highly Saturated	65% Min. Saturates

The use of this new table would delete NAPH (naphthenic) and PAR (paraffinic) from Table II of D 1419-60T and substitute in their place the terms SA and HI-SA. The test methods for the estimation of the oils are to be published for information only as an appendix to D 1419-60T.

It was voted to request the officers of Committees D-11 on Rubber and D-2 on Petroleum Products to appoint a combined task group for the purpose of developing a classification of rubber extender oils (at the next meeting).

A letter-ballot in Committee D-11 will be requested to confirm the assignment of additional numbers to Table II of D 1419-60T.

Dr. Garvey announced that he had been confirmed as the convener of Working Group C on Raw Rubbers of ISO TC 45.

Subcommittee 15 — Life Tests for Rubber Products. G. C. Maassen, R. T. Vanderbilt Co., chairman. M. G. Schoch, Hewitt-Robins, Inc., chairman of task group 1 on the correlation of oven and shelf aging, reported that the 12 years of shelf aging results were completed and suggested that the results be published as an addendum to the original work published in 1949. Approval for publication of the results of the entire project in the ASTM Bulletin was requested. Since the work of task group 1 has been completed, it was dismissed with thanks.

J. E. Norton, Atlas Electric Devices Co., chairman of the task group on weathering, reported that the plastic color chip method of determining light intensity had been adopted by Committee D-20 on Plastics, and that only the mechanics of preparing and distributing standard samples remain to be handled. This latter situation should be resolved by the early 1961 meeting, at which time the procedure and specifications will be presented to Committee D-11.

A. E. Hicks, Petroleum Chemicals, Inc., chairman of the task group on staining tendencies of carbon black, reported that inter-laboratory tests on various samples indicate sufficient sensitivity of test methods to determine small color differences. Based on these data the task group is designing an ex-

periment to determine the discoloration of white rubber when adjacent to carbon black-containing compounds.

G. N. Vacca, Bell Telephone Laboratories, chairman of the task group on oven aging, reported that the recent round-robin tests using the Apex¹ tubular oven showed much better agreement than had previous tests. Further work is being done on this type of oven and the methods of using it.

A. G. Veith, Goodrich, chairman of the task group on ozone testing, reported that there were several negative votes on the recent letter-ballot for revision of D 1149-55T, Method of Test for Accelerated Ozone Cracking of Vulcanized Rubber. The negative votes were all reconciled by motions passed by the subcommittee, as follows: (1) Standard test temperature shall be 50° C. rather than 100° F. (2) Add after item 9(d): "The above is a static test under one set of conditions. Other conditions encountered in actual use and dynamic tests in conjunction with static are desirable, but no agreement has yet been reached on standard method or methods." (3) Item 4(a), strike out the words in the second sentence, "the method used," and substitute "A method which is satisfactory, but not necessarily mandatory." (4) Refer to all temperatures in Centigrade rather than Fahrenheit so as to conform to the standard temperatures shown in D 1349-58T, Recommended Practice for Standard Test Temperatures for Rubber and Rubber-Like Materials.

A negative vote on the letter-ballot to move D 518-57T, Method of Test for Resistance to Surface Cracking of Stretched Rubber Compounds, was based on the premise that the standard could not be used for a purchase specification. It was voted to override the negative vote because the intent of D 518-57T is surely for a test method which could be used for referee purposes.

A negative vote on moving D 750-

55T, Method of Test for Resistance to Accelerated Light Aging of Rubber Compounds, from tentative to standard was resolved by deciding that D 750-55T should remain as tentative until D 749-43T, Method of Calibrating a Light Source Used for Accelerating the Deterioration of Rubber, has been revised, at which time D 750-55T will need to be changed.

Subcommittee 16 — Description and Classification of Rubber Compounds.

J. F. Kerscher, Goodyear, chairman. A detailed tabulation of the replies received to a questionnaire on "A Practical Method of Classifying All Elastomeric Vulcanizates," by N. L. Catton, R. C. Edwards, and T. M. Loring, as published in the January, 1960, *ASTM Bulletin*, was distributed. The questionnaire had been circulated to the entire membership of Committee D-11 and was designed as a means of finding out how the method would satisfy the needs of individual rubber technologists and was not intended to be considered a letter-ballot. The 90 replies received were representative of a cross-section of the rubber industry and rubber products involved and individual representation, whether the respondent was a producer, consumer, the military, general interest, etc.

General indications are that the attitude toward the proposed so-called "expanded tabular system" is favorable although there was some opposition and some uneasiness among a few respondents to the questionnaire, possibly because of their unfamiliarity with the method.

The authors of the new classification method are at present preparing actual tables with D 735-59T, Specifications for Elastomer Compounds for Automotive Applications values transposed and with a format to accompany the tables, which should be available for inspection by interested parties soon.

The question was raised that there are possible compounds or there may be compounds in the future that cannot be classified under the new system simply because no provision has been made for them at the outset. The chairman of subcommittee 16 expressed the view that it will be the intent to restrict the use of the system to those valued which appear in the tables; however, this does not mean that such tables cannot be modified to include values which will make it possible to describe almost any compound, once it has acquired commercial status. The above viewpoint was explained in light of the request that one be permitted to use the system to classify a compound with any set of properties, even though it might be considered an impractical compound, and then work with a producer in an attempt to obtain a compound defined by such properties.

It was voted that the subcommittee continue the development of the new classification system as a result of the returns from the questionnaire.



J. J. Allen, D-11 secretary

¹RUBBER WORLD, Aug., 1959, p. 723.

Subcommittee 19—Tests for Properties of Rubber and Rubber-Like Materials in Liquids. M. F. Torrence, Du Pont elastomer chemicals department, chairman. Task group A on changes in D 471-59T, Methods of Test for Change in Properties of Elastomeric Vulcanizates Resulting from Immersion in Liquids, reported that replies to its first questionnaire had been received, and that a round-robin test program of tests at 400° F. was being organized.

The latest draft of the ISO/TC 45 proposal for testing the resistance of vulcanized natural and synthetic rubbers to liquids was approved. It is in agreement with the present D 471-59T.

Correction of a typographical error in the wording of D 471-59T dealing with the use of ballast in weighing immersed samples was approved.

Subcommittee 20—Adhesion Tests. P. J. Larsen, Lord Mfg. Co., acting chairman. Minor differences between ISO/TC 45 Draft Proposals 515 and 517 and D 429-58, Methods of Test for Adhesion of Vulcanized Rubber to Metal, were resolved with recommendations to be made to Committee D-11 and ISO/TC 45.

There was little interest in the recently introduced Russian and Italian adhesion test methods. Considerable interest was shown in a new adhesion test method of Lord Mfg. Co.,² in which conical shaped inserts are used instead of the flat-surface metal surfaces of D 429-58. The new method appears to have equal or better accuracy when compared with D 429-58, Method B.

Interest was also shown in a revision of D 429-58, Method B, which involves the use of a 45-degree instead of a 90-degree peeling angle. Literature on this revision will be distributed to the members of subcommittee 20 so that a more extensive discussion may be held at the next meeting.

Further study with more comment forthcoming is planned for the proposed D 429-58 supplement involving standardized environmental exposure and measurement of the effect of the same on test results. The proposed supplement agrees in philosophy with that recently received from S. Brams, Dayton Chemical Products Laboratories, except for sample appearance. It was felt that the use of the now current D 429-58, Method B, sample was an advantage in favor of the original proposal.

G. Vacca will replace Henry Peters as chairman of the task group on wire and cable adhesion tests and will make a progress report at the next meeting of the subcommittee.

Subcommittee 20 indicated little interest in continuing work on metal-to-metal adhesion testing. J. F. Anderson, chairman of subcommittee 21, will bring the members of subcommittee 20 up-to-date on progress by other ASTM

groups, especially Committee D-14 on Adhesives, in the area of metal-to-metal adhesion, at the next meeting of subcommittee 20.

D. Pratt, U. S. Navy, Bureau of Ships, explained the Navy's investigation of the comparability of rubber adhesion test methods and the possibility of altering D 429-58 to allow its use in the testing of bonds made without heat. Excerpts of the Navy report 5611-3 will be sent to the members of subcommittee 20 for examination and comment.

W. A. Frye, Inland Mfg. Division, General Motors Corp., and J. H. Macey, Goodrich, respectively, reported no change in the status of the work on dynamic and on non-destructive testing. Mr. Frye will make a partial report on dynamic testing and the use of the Lord conical shaped inserts, at the next meeting of the subcommittee.

Subcommittee 21—Testing of Rubber Cements and Related Products.

J. F. Anderson, Goodrich, chairman. The meeting of the subcommittee was preceded by meetings of two of its task groups. Task group 2a on textile cord adhesion has about completed its writeup of the "H" adhesion test method. Problems in connection with the temperature of the sample and time of test and length of heating time were resolved, and the method will be re-written for approval at a special meeting to be held on November 10, 1960, thus permitting for a letter-ballot of the method in D-11. This task group is also about to review possible methods of dynamic testing.

Task group 2b will review a series of tests using a modified "H" test-type mold for wire cord to rubber adhesion. Results of previous round-robin tests encourage the group to believe that with certain changes the test will be one of three suggested methods that will be acceptable. The other two methods will be based on pullout tests using in one case the Firestone mold and in the other a compromise of the Good-year, Goodrich, General Tire, and National Standard designs. There was some discussion concerning the desirability of writing test methods for measuring adhesion between wire coated with adhesives and the rubber matrix.

R. A. Goepfrich, Bendix Corp., chairman of the bonding of brake lining subcommittee of the SAE Committee on Brakes, reported on various testing programs for the adhesion of brake linings to brake shoes; some phases of this work is based on ASTM D 1205-59T, Methods of Testing Adhesives for Brake Lining and Other Friction Materials, and some are new and of future use to Committee D-11.

J. H. Macey reported that non-destructive radiographic measurements of adhesion show up voids or cavities, but do not provide a measure of adhesion or adhesion failures.

The task groups of subcommittee 21 held four meetings during the past year.

Subcommittee 22—Flexible Cellular Materials. L. A. Wohler, Firestone, chairman. The advisory committee of Committee D-11 has approved changing the name of subcommittee 22 from "Cellular Rubbers" to "Flexible Cellular Materials," in order to describe more adequately the activities of the subcommittee. The scope of the subcommittee will be revised also to coincide with the name change.

A letter from C. S. Yoran on ASTM-SAE Tech A Committee section IVN's activities reported no negative votes were received on the letter-ballot on the vinyl foam flammability test. One negative vote was received on the letter-ballot on urethane-foam test methods and specifications. The latter problem was resolved by excluding the tables temporarily from the SAE publication of the method until agreement is reached on the two deflection point system for indentation compression desired by the automotive industry representatives.

A correction of an error in form in Table I of D 1565-59T, Specifications and Methods of Test for Flexible Foams Made from Polymers or Copolymers of Vinyl Chloride, was suggested.

The flammability test for vinyl foam, D 1692-59T, Tests for Flammability of Plastic Foams and Sheeting, will be revised editorially and submitted to Committee D-11 letter-ballot.

Flammability testing of urethane foam was discussed, and the activities of the task force appointed at the last meeting of the subcommittee reviewed. Many factors such as areas from which the sample is taken, contamination by dirt, age, etc., constitute variables which introduce errors in the results. No further work will be done by subcommittee 22 at this time, but close liaison with the group from the Society of the Plastics Industry working on this problem will be maintained.

Subcommittee 22 will study ISO/TC 45 Documents 456, 471, and 472 covering cellular materials in hospital mattresses, furniture and transportation seating. ISO/TC 45 test methods for urethane foam will be circulated and reviewed by the subcommittee also.

A proposed test for determination of the abrasion of flexible foam was discussed. In brief, the test consists of rotating the foam specimen with an abrasive element placed against its surface. The Weidenbeck test of Committee D-13 on Textiles will be investigated for possible application in testing the abrasion resistance of foams.

Subcommittee 23—Hard Rubber. W. J. Dermody, Electric Storage Battery Co., chairman. A. W. Moline, American Hard Rubber Co., has resigned from the subcommittee. H. L. Sherwood, Electric Storage Battery Co.,

²See RUBBER WORLD, July, 1960, p. 71.

meetings and reports

was elected secretary of subcommittee 23.

Henry Peters, Bell Telephone Laboratories, chairman of task group 4, reviewed progress on a system for classifying hard rubber grades. The task group will continue its work and attempt to devise a system which will use values for the tests covered in D 530-60T, Methods of Testing Hard Rubber Products. Consumer needs will be the basis of the system, and producers will be asked to comment.

A request to change the temperature specified for the bulge test in D 639-60T, Methods of Testing Asphalt Composition Battery Containers, from 160 to 200° F., will be letter-balloted in the subcommittee.

Since task group 4 is presently the main activity of subcommittee 23, it was agreed to forego a meeting of the subcommittee in early 1961 and hold instead a task group meeting with the time and place to be selected by Mr. Peters.

Subcommittee 24—Rubber and Rubber-Like Coated Fabrics. K. L. Keene, United States Rubber Co., chairman. A. G. Roberts, NBS, described work on the abrasive jet method of determining the abrasion resistance of coated fabrics. The work done to date indicates certain limitations of this method for coated fabrics applications. Some further work, however, is planned.

W. H. Bryan, Du Pont, gave a brief report on his work in subcommittee 25 where methods of conducting cold resistance tests on coated fabrics are being investigated.

K. L. Winkley, Hodgman Rubber Co., gave a report on flammability tests on coated fabrics which indicated the need of at least two types of tests, depending on the end-use of the product. Further work is planned.

Miss Margaret Hays reported that Committee D-13 will drop the trapezoid tear test method because it is considered to be more of a tensile than a tear test. No action was taken by subcommittee 24; however, some new test methods such as the Elmendorf twist tear method will be investigated.

The Taber abrasion test method was reviewed briefly by the chairman of the subcommittee, who reported that Taber Instrument Corp. had been invited to send a representative to the Atlantic City meeting of subcommittee 24 to help write a test procedure for conducting a round-robin test program. The request was not considered feasible by the company, who, in turn, invited all members of subcommittee 24 to visit their laboratories at North Tonawanda, N. Y. A round-robin program will be inaugurated if preliminary test results indicate such a program to be desirable.

The resignation of Miss Hays as subcommittee secretary was accepted regretfully, and the chairman expressed his appreciation for her fine work and



L. V. Cooper, ASTM director

cooperation during the years she served as secretary. Mr. Bryan was appointed to replace Miss Hays as secretary.

Subcommittee 25—Low-Temperature Tests for Rubber and Rubber-Like Materials. R. S. Havenhill, St. Joseph Lead Co., chairman. W. H. Bryan, chairman of the task group on low-temperature tests for coated fabrics, reported on the results of a round-robin test program. This work indicated the need of further tests on coated fabrics which would fail in the -30 to -65° F. range. Additional laboratories were needed to carry out the D 746-57T brittleness tests, and B. F. Goodrich and Bell Telephone Laboratories agreed to participate in the new round-robin test program.

The subcommittee chairman reported that Committee D-20 has agreed to modification of D 746-57T to allow any type of actuation provided the speed and other parameters of the test were met. Also, the difficulties of using Freon 12 and its possible replacement with Freon 13 or 13B as heat transfer mediums were discussed, and the chairman will contact Committee D-20 on this problem.

Recent revisions of Federal Specifications 5311, 5611, and 5612 were discussed, and it was pointed out that specimen thickness should be the same for 5611 and 5612, which would mean changing 5612 to call for a specimen 0.085 ± 0.025 of an inch in thickness.

Three negative votes on the advancement to standard of D 1053-58T, Method of Measuring Low-Temperature Stiffening of Rubber and Rubber-Like Materials by Means of a Torsional Wire Apparatus, were considered. One negative vote was overruled as it was felt that it was not necessary to hold a method as tentative just because ISO/TC 45 was giving it consideration. The two negative votes representing the National Electrical

Manufacturers Association and the wire and cable producers were discussed, and it was decided that the method would be retained as tentative.

This method will be revised following word from C. H. Seaberg, representing the NEMA and General Electric Co., and H. E. Charles, Okonite Co., regarding inclusion of a statement allowing the use of a certified tensile test slab where the specimen taken from the finished article is too small to meet the present size requirements. After this change is made, the method will be brought up again for advancement to standard.

Subcommittee 26—Processability Tests. R. H. Taylor, Scott Testers, chairman. J. F. Kerscher, Goodyear, gave a report on the work done by his task group on the evaluation of the extrusion die No. 1 (Garvey type) for processability tests. More work is necessary to determine the effects of die design (not die contour), different compression ratios of the screw, and the relation of screw diameter to length of barrel in the extruder used. Work to date justifies recommendation of the use of extrusion die No. 1 contour and one of the two methods proposed for grading extrusions.

F. J. Sackfield, American Synthetic Rubber Corp., chairman of task group 5, reported on the progress of his group in developing methods for evaluating shrinkage. It is hoped that the group will have a proposed method for the shrinkage of both raw and compounded rubbers for presentation at the next meeting of the subcommittee. The method for raw rubber has already proved satisfactory.

The ISO/TC 45 proposal for the use of the Mooney viscometer was discussed, and slight differences between this proposal and D 1646-59T, Method of Test for Viscosity and Curing Characteristics of Rubber by the Shearing Disk Viscometer, were pointed out. The proper procedure will be forwarded for approval by ISO/TC 45.

The subcommittee authorized the chairman to appoint a new section to study the effect of pressure on Mooney viscosity results.

Subcommittee 27—Tests of Resilience. W. A. Frye, Inland Mfg. Division, chairman. Progress on the review of the forced vibration method was reported, based on the reports of five out of seven persons who had been asked to review the method. Their suggestions will be incorporated in a revised method, which will be submitted for letter-ballot in the subcommittee.

There was a discussion on flexometer tests, Joule effect tests, and high-speed extension tests.

There was discussion also of the sinusoidal dynamic strain tester devel-

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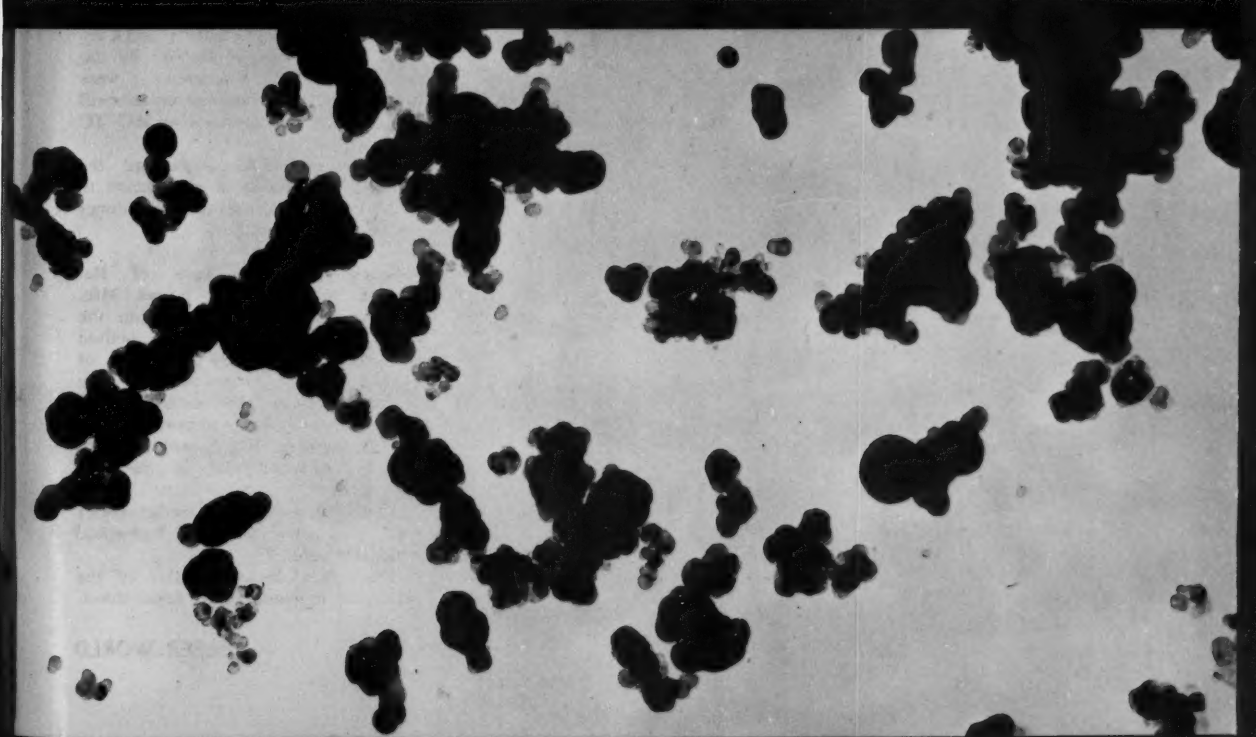
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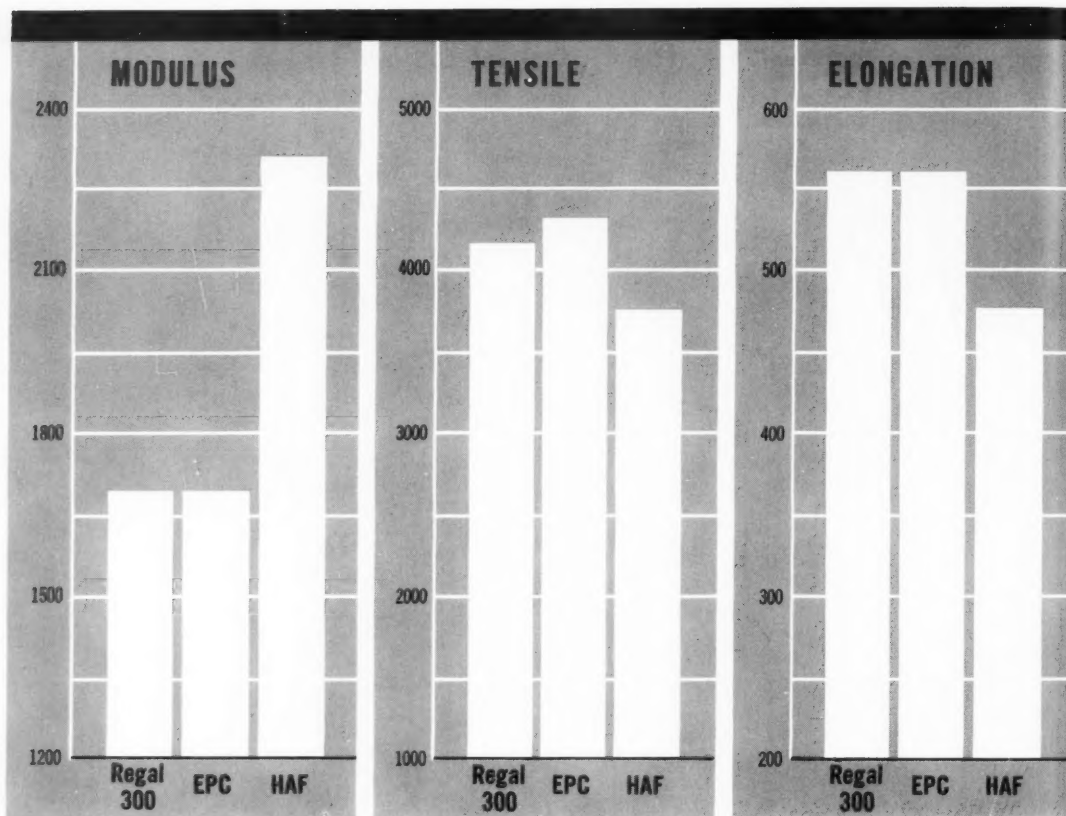
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It provides rubber properties virtually identical with those of premium-priced channel blacks, but with the faster curing rate of HAF types. The similarity in stress-strain properties between Regal 300 and EPC black and the contrast with HAF black are illustrated above.

Although Regal 300 falls near the particle size of a channel black or an HAF black, the "structure" of this new black, as indicated by its low oil absorption, is similar to channel black and significantly less than has been previously available from an oil furnace black in this particle size range.

Regal blacks have been road tested and proved in more than 3,000,000 tire miles of road tests. Fully comparable with EPC black in modulus, tensile and elongation properties, Regal 300 has actually outperformed channel blacks in wear and

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Definitely recommended for highway, off-the-road truck and passenger car tire treads and tread rubber, Regal 300 gives service which is typical of channel black resistance to tearing, cutting and chipping. And it offers the economic advantages of being manufactured from oil.

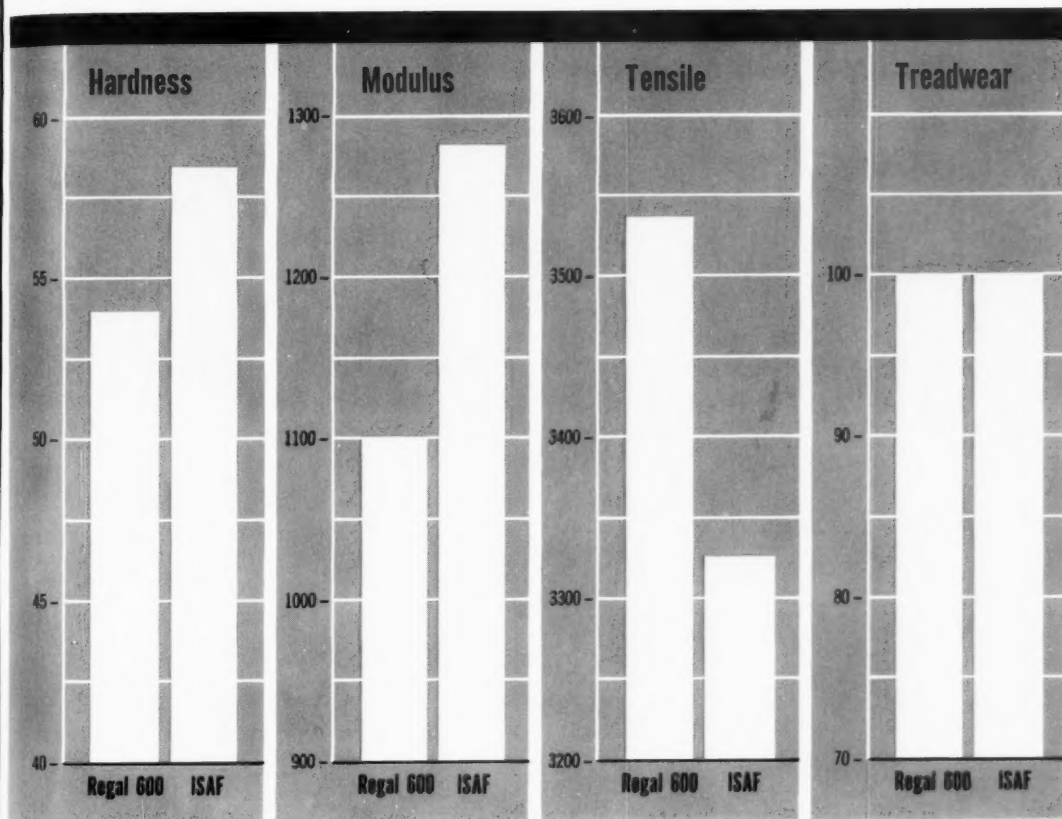
Regal 300 is just one of a new family of blacks developed by Cabot research, including Regal 600 — a totally new type of oil furnace black for passenger car tire treads and tread rubber, and Regal SRF, the first semi-reinforcing carbon black to be made from oil.



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combines properties never before available
in ANY grade of carbon black...



New Regal 600 furnishes a unique combination of low hardness with high tread wear resistance, offering interesting product improvement possibilities not available from either gas-produced or from other types of oil furnace blacks.

This new-type oil furnace black gives low hardness and low modulus in passenger car tire treads and tread rubber for a quieter ride and superior traction. It combines these features with the excellent tread wear resistance of an ISAF black.

The average particle size and surface area of Regal 600 are in the range of an ISAF black but its "structure", as shown in its low oil absorption, is much lower than with an ISAF black. This

unusual combination of fine particle size and very low structure is a carbon black property never before available in oil furnace grades.

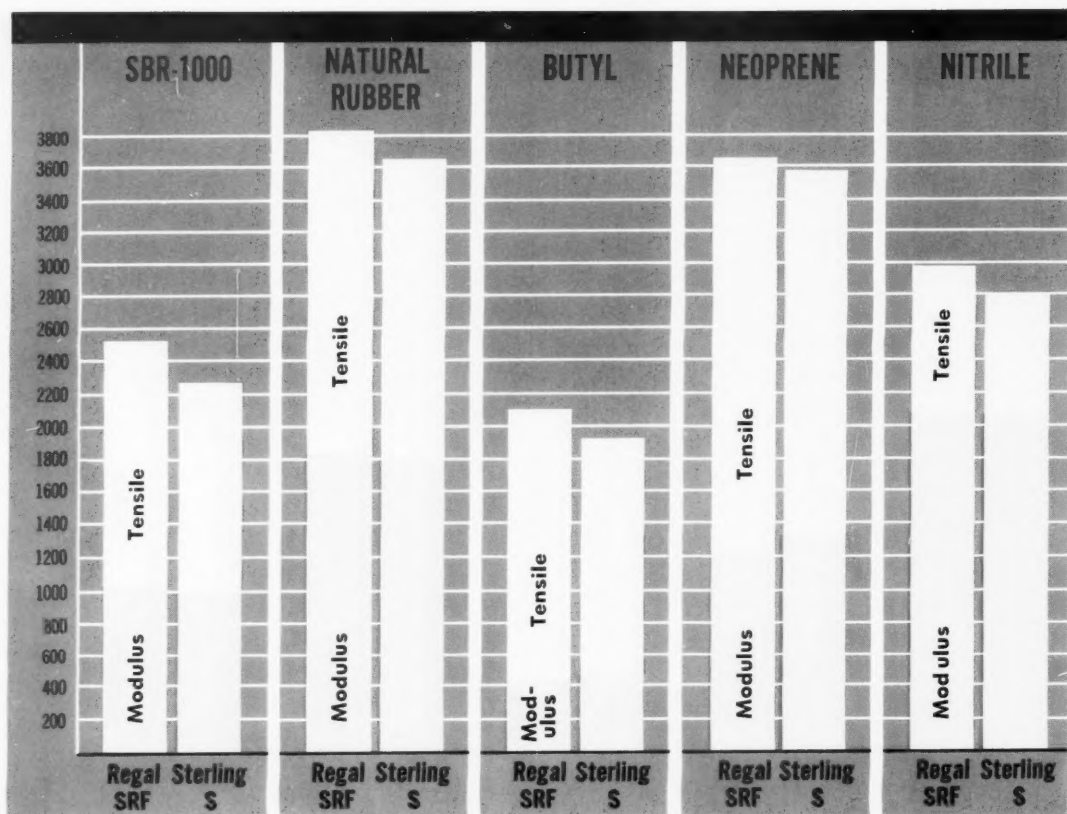
Regal 600 has outperformed ISAF black in cold SBR, oil-extended SBR, and natural rubber, yielding higher tensile strength and elongation, lower modulus and hardness, lower heat generation, and better cut growth resistance. The contrast in properties between Regal 600 and an ISAF black is illustrated above.



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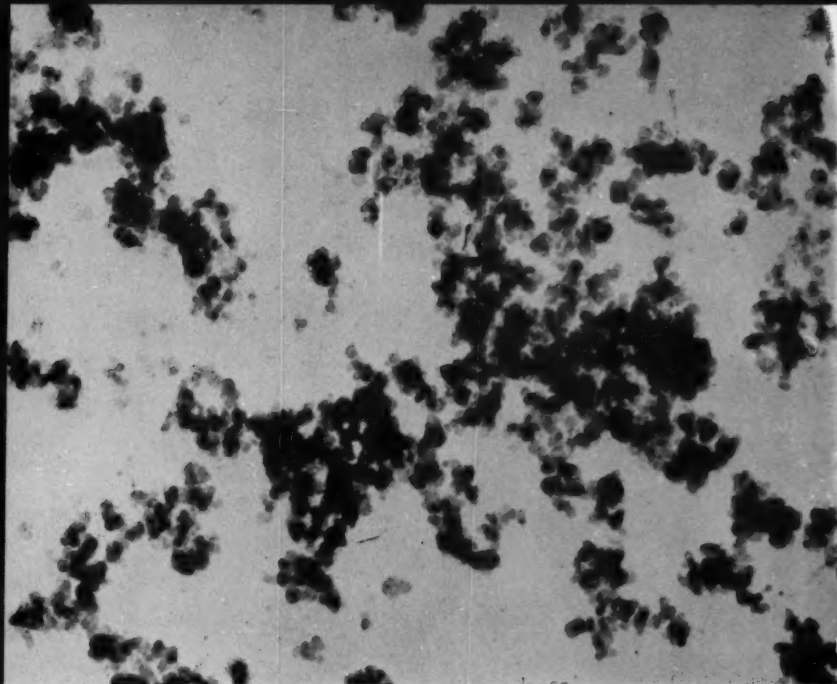
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For two excellent reasons. **FIRST**, for the added convenience of Cabot customers the world over. New Regal SRF is interchangeable with gas-produced SRF, giving equal physical properties and processing characteristics. It provides equivalent modulus, hardness, tensile strength, elongation, tear resistance, resilience, and compression set in natural rubber, SBR, butyl, neoprene, and nitrile rubber. Yet, unlike gas-produced SRF, it can be produced at locations where there is no natural gas, and is commercially available from both domestic and overseas Cabot plants.

SECONDLY, the price of Regal SRF will not be affected by the increasingly prohibitive cost of natural gas, because it is made from oil, and it is available at local currencies. This means overseas users need no longer import gas-SRF from the U. S. in exchange for American dollars. The result: greater convenience in ordering, faster and more efficient delivery.



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Regal blacks are produced world-wide by a new, exclusive process from oil.

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Regal blacks combine characteristics never before available in oil furnace blacks—making it possible to extend their use to compounds which traditionally have required more expensive pigments.

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Depending on the type of Regal black used, you can profit at least 3 significant ways:

- 1) **you save money** by choosing a Regal black to replace more costly blacks of another type.
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Regal 300, Regal 600 and Regal SRF are only the first of a whole family of new type oil furnace blacks being introduced by Cabot.

The Cabot variety of oil furnace blacks will continue to be extended to include quality grades never before made available. Thus, by adding new blacks to the group being manufactured from oil, Cabot continues to assure an uninterrupted supply of carbon blacks for all purposes, world-wide, from raw materials not subject to the economic pressures affecting natural gas, and at locations where there is no natural gas. Regal is another notable first for Cabot, world's largest producer and seller of carbon black, industry leader for 78 years.



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 Cabot France, S.A., 45, rue de Courcelles, Paris 8, France
 Cabot Italiana S. p. A., Piazza Mameli 5, Ravenna, Italy
 Cabot Europa, 45, rue de Courcelles, Paris 8, France

oped by A. R. Payne, of the Research Association of British Rubber Manufacturers.

Subcommittee 29—Compounding Ingredients. A. E. Juve, Goodrich Research Center, chairman. The five negative votes received on the recent Committee D-11 letter-ballot on the proposed specification for carbon blacks for use in rubber and the revised version of D 1522-58T, Methods for Testing Carbon Blacks in Rubber, were based on objections, all from synthetic rubber producers, of the use of a natural rubber test recipe. After explaining that as soon as the proposed methods were approved, subcommittee 29 would proceed with the development of a test recipe based on SBR, the negative votes were withdrawn. The present proposals are intended primarily for the use of rubber products manufacturers and carbon black producers and their relations with each other. The development of SBR test recipes and certain other new proposals are intended for the use of the synthetic rubber producers and carbon black producers and their relations with each other. The appointment of a task group to carry out this work was authorized by the subcommittee.

Since the above-mentioned proposed specification for carbon blacks is the joint responsibility of Committees D-24 on Carbon Black and D-11 on Rubber, a letter-ballot was also taken in D-24. For the purposes of clarification and to reconcile certain negative votes in D-24, several editorial changes were recommended by D-24, and they were unanimously approved by subcommittee 29.

R. O. Treat, J. M. Huber Corp., reported on the continuing tests by his task group on the stability of Industry Reference Black No. 1. After 1½ years there has been no measurable change in the properties of the black, whether stored in bags or sealed containers, when tested in rubber. The task group will continue periodic checks on this reference black as long as the lot lasts.

It was reported also that one lot of this reference black was abnormal in that it produced lower modulus values than other lots. Mr. Treat's task group will investigate this situation to determine if there is only one abnormal lot, in which case it can be scrapped; whether all the remaining lots of reference black can be blended; or whether the lot should be scrapped, and another lot produced.

C. W. Sweitzer's task group on the development of methods for measuring the degree of pigment dispersion in rubbers reported that it would be desirable to have both a quick and more time-consuming but more precise type of tests. The quick test would be applicable to masterbatches and unvulcanized mixes and would be capable of giving a semi-quantitative rating of the degree of dispersion. The

second test, which would be more precise and time-consuming and which would require more elaborate equipment, would serve as a reference method. An active program on these problems is under way.

John Gifford, Witco Chemical Co., suggested that the method of D 1522-58T might be improved by the use of masterbatches, one of which would contain the zinc oxide and the other the sulfur, accelerator, and stearic acid, and presented data showing some improvement in reproducibility of test methods when these masterbatches were used. It developed that many laboratories were using such masterbatches since the technique not only improved reproducibility, but reduced mixing time. (This technique applies only to the mill mix method, not the Banbury mix method).

The subcommittee authorized the appointment of a task group to investigate this masterbatch technique and to try to come to an agreement as to which of the several masterbatch techniques might be preferable and acceptable to all concerned.

Technical Committee A Report

The report on the activities of the ASTM-SAE Technical Committee on Automotive Rubber was presented by H. Tangenberg, Goodrich, the secretary of the committee.

Three items have been letter-balloted in Tech A and were sent to the parent societies for their consideration, as follows: (1) a new latex dipped goods and coating specification; (2) a complete revision of SAE 10R and D 735-59T, Table VI, Class TB; (3) a new automotive air-conditioning hose specification for the SAE Handbook.

Two new general-interest members were added to the committee: D. T. Bradley, Clevite Harris Co., and F. M. Gavan, Armstrong Cork Co.



General Tire Photo

L. V. Cooper, at the Akron Group summer outing, points out features of the Firestone Country Club golf course to Milt Leonard, chairman

Work on zone testing by task group IV-P-4 has been approved by Tech A, and the results have been presented to subcommittee 15 of ASTM D-11 for possible incorporation in D 1149-55T or in D 1171-59, Method of Test for Weather Resistance of Automotive Rubber Compounds, or a consolidation of these two methods.

The automotive hose sections of Tech A have studied the effect of anti-freeze materials on hose and submitted their recommendations to subcommittee 5 of ASTM Committee D-15 on Engine Anti-Freezes. Coolant and heater hose, and wire braided hose specifications are being reviewed. Consideration is being given to adding nylon brake hose to SAE 40 R-1. Pulley-groove depths and the possible combination of industrial and SAE belt standards are being considered by the section on V-belts. The hydraulic brake-cup section is working on lip-seal tests as well as on stroke-testing equipment.

Much of the activity of section IV of Tech A revolves around the incorporation of the tables in ASTM D 735-59T in the new proposed expanded tabular system for all rubber compounds of Catton, Richards, and Loring. The paper on this subject by these authors was presented before the rubber committees of the Department of Defense on March 10, the Chicago Rubber Group on March 11, and the Tlari Rubber Technology Foundation on June 1. It is scheduled for presentation before a meeting of the SAE on farm and industrial machinery on September 15, and it is hoped that it might be the subject of a panel discussion at the January, 1961, meeting of SAE.

Akron Rubber Group Holds Summer Outing

More than 1,200 persons attended the summer outing of the Akron Rubber Group, June 17, at the Firestone Country Club, Akron, O. The day's activities included a dinner under a big top tent, a golf tournament with 411 participants, a decathlon contest with 190 taking part, and a giant putter contest with 50 contestants.

Francis W. Burger, of Phillips Chemical Co., was general chairman of the outing. Committee chairmen were: Dan Chovan, Witco Chemical Co., golf committee; C. R. Simpson, Harwick Standard Chemical Co., prize committee; L. V. Cooper, Firestone Tire & Rubber Co., location and food; Maynard Bobbin, Firestone, decathlon contest; R. B. Knill, Goodyear Tire & Rubber Co., publicity; B. N. Larsen, Naugatuck Chemical Division, tickets; and V. F. Springer, B. F. Goodrich Co., membership.

SRG Hears about Weighing, Statistics And the Rubber Industry in the '60's

The spring meeting of the Southern Rubber Group, held at the Dinkler-Tutwiler Hotel in Birmingham, Ala., June 10 and 11, was attended by approximately 200 members and guests. The technical program on June 10 consisted of talks on weight controllers and the automatic handling of bulk materials, and on statistical compounding. On June 11 there was a program devoted to "The Coming Decade in the Rubber Industry."

At the banquet on the evening of June 10, a very comprehensive review of the Army's missile program was presented by William W. Carter, chief scientist, Army Ordnance Missile Command, Huntsville, Ala. The banquet was preceded by a cocktail party by courtesy of suppliers to the rubber industry.

Group Chairman Elden H. Ruch, Firestone Tire & Rubber Co., presided at the business meeting on the afternoon of June 10. New officers elected were announced as follows: chairman, Lenoir Black, C. P. Hall Co.; vice chairman, Roswell C. Whitmore, Better Monkey Grip Co.; secretary, R. W. Rice, Firestone; treasurer, Martin Samuels, Copolymer Rubber & Chemical Corp. New directors will be C. P. McKenna, Vector Mfg. Co., and R. B. Camp, Goodyear Tire & Rubber Co. The Group paid tribute to Chairman Ruch at the conclusion of his term of office.

It was announced that the fourth recipient of the Harmon Connell Memorial Scholarship of the SRG is Hugh Otis Holland, Jr., who will be a senior at Mississippi State University during the 1960-61 school year. This scholarship was established in 1957 to honor the memory of Harmon Connell, who

was the first chairman of the Group and a graduate of Mississippi State University.

Weight Controllers and Statistical Compounding

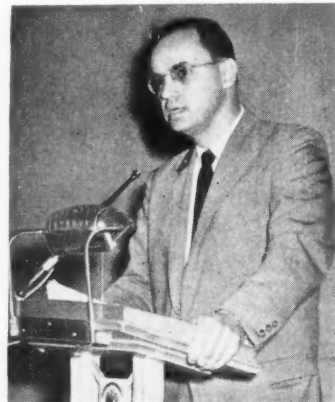
Roger B. Pfau, Texas-U.S. Chemical Co., presided at the first technical session on the afternoon of June 10 and introduced the speakers on automatic weighing and statistical compounding.

"Application of Weight Controllers to the Automatic Handling of Bulk Materials," by Walter M. Young, director of sales, Richardson Scale Co., was the first paper on the program. This speaker emphasized first that industrial weighing involves much more today than a scale which, important though it may be as a component in a system, is only one of many components, and there are numerous other weight controllers, many of which may not be recognized as such. Bulk materials vary infinitely in chemical and physical properties, and a pat formula has not yet been developed that simply classifies the properties and establishes the parameters for proper weight control. Broadly, the weight control of a process falls into the three categories of materials handling, weight sensing, and process instrumentation for weight control, and Young then went on to describe in some detail these categories.

Under developments in bin flow that aid weight control, a method using containers called stack bins has been devised for storing rubber pellets in large quantities. One-ton quantities of pellets are stored in compartments, one above the other, with an air-operated supporting plate in each to prevent an

accumulation of pressure and the sticking of the pellets to one another. Special scales for handling oils, rubber pellets, carbon blacks, and accelerators were also described.

The weight-sensing device is the brain of any automatic weighing system, and those which produce an output signal usable for weight control were listed as follows: (1) dial scale when equipped with transducer; (2) coil spring with transducer; (3) the load cell (electrical, pneumatic, or hydraulic); (4) the power-driven poise;



Walter M. Young

(5) cantilever beam with transducer. The weight-sensing devices permit the application of all kinds of instrumentation; so there is little, if anything, which the scale and instrument company cannot furnish today to meet the most complex requirements of the process engineer.

Basic instrumentation devices that work from the weight sensors are the analog indicator, the circular chart recorder, the automatic typewriter read-out, the printing totalizer, and the over/under meter which monitors the correctness of each weighing.

A recent development in remote weight control is the Formula Capsule which is preset in a separate instrument and is appropriately marked with material identification plus weight required and formula number. This system is particularly useful where size is important and where there are frequent formula changes.

Another system of automatic weight control is the punched-card system which has the advantages of ample data storage capacity on inexpensive cards that provide a permanent record, permit quick formula changes, and permit the formulations to be kept secret, if desired. Disadvantages are the damage which may be done to the card by careless handling, the fact that the cards cannot be altered, but require a new card, when a change is desired, and the fact that card selection may be a problem if a large number of cards are kept on hand.



New officers SRG, left to right: M. Samuels, treasurer; C. P. McKenna, director; L. Black, chairman; R. B. Camp, director; R. W. Rice, secretary; R. C. Whitmore, vice chairman

Where the punched card cannot be advantageously used, there is a more durable Formula Board by which the programming data are set up with pegs instead of holes. A verifier has been developed as a checking device to make certain the data patched into the board are correct.

Young concluded his talk with illustrations of a latex blending system using pumps for feeders and tanks for weigh hoppers and as weight sensors load cells of the electrical type, a modern bakery employing a punch-card system, and a modern feed mill where weight control meant special bin feeder and scale design and with which a punched-card system was also used.

"Compounding with Statistics," by P. F. Bertsch, E. I. du Pont de Nemours & Co., Inc., elastomer chemicals department, made reference to a paper, "The Use of Regression Techniques in Elastomer Compounding," which this author gave before the International Rubber Conference in Washington, D. C., November, 1959. The original paper outlines the application of mathematics and statistics to compounding problems, and to make the end-product of these methods generally available to rubber compounders, an approximate graphical method of analysis has been devised.

The statistical technique entails progressing from data to graphs of properties via mathematical equations, Mr. Bertsch said. These graphs are contour graphs where properties appear as lines of constant value (isoplethes) plotted in a coordinate space of compounding variables (e.g., where the X axis might be carbon black concentration, and the Y axis oil concentration). The graphing method is analogous to that used for topographical maps where elevation is plotted as contours of constant value in a coordinate space of latitude and longitude.

The graphical method permits a compounder to go immediately from the data to the contours via a simple, rapid graphical technique. Since the same compounds are used to develop the data for all the properties of interest, all families of contours (one family for each property) are generated on identical graphs and can, therefore, be superimposed and studied simultaneously.

The compounds which are chosen in light of the compounder's experience and intuition appear as X's in the coordinate space of compounding variables (e.g., as mentioned previously, perhaps black on one axis and oil on the other). The property value, as it is measured, is fixed to the appropriate X. The X's are joined by lines between all possible pairs. Since each line has values for the end-points, it is logical to interpolate along the line. The interpolation is linear unless prior knowledge indicates otherwise. It will develop that several measured or estimated

points will be of the same value, and when these are joined by a continuous line or curve, the family of contours will develop for that property, it was said. Similarly, other properties are analyzed, and finally they are superimposed to answer questions posed to the analyst (one of the family of contours will usually be cost).

Banquet Program

Mr. Pfau presided also at the banquet on the evening of June 10 and paid tribute to the work of the past officers of the Group and introduced the new officers. He then introduced James H. Sparks, Robbins Floor Products Co., who acted as master of ceremonies and presented the speaker for the evening, William W. Carter, chief scientist, Army Ordnance Missile Command, Redstone Arsenal, Huntsville, Ala.



William F. Carter

Dr. Carter explained the 19 missile systems currently under development or support by the Army Ordnance Missile Command and showed models of many of the missiles. The Nike-Ajax surface-to-air missile was deployed in 1953. Its successor, the Nike-Hercules, became operational in the Summer of 1958. The latest member of the Nike family is the Zeus, currently the only anti-missile under active development. Some of the details of this amazing system, which permits defense against surface-, submarine-, or air-launched ballistic missiles, glide vehicles, or other bombardment missiles, were given.

Other missiles described included the Hawk for defense against low-flying aircraft; the Redeye, a shoulder-held weapon, also for defense against aircraft; the Sergeant, which has atomic capability; the Lacrosse, a close-support guided missile of great accuracy; and the Honest John and Little John models for use in the field much like conventional artillery.

Dr. Carter mentioned the development of the Pershing missile, which is

in the same class as the Redstone missile; the latter is the second largest missile developed by the Army. The Jupiter, the Army's largest model, has since been turned over to the Air Force. The Pershing will retain the mobility, field worthiness, and accuracy of the Redstone, but will be much lighter, smaller, and more mobile, it was said.

Dr. Carter pointed out in conclusion that the Army has available a very broad spectrum of missiles designed for both all-out thermonuclear war or more limited war, and that the Army believes that continuation of the limited form of ground warfare such as took place in Korea is much more probable in the future than all-out thermonuclear war.

Rubber Industry in the 1960's

The panel discussion on the morning of June 11 was entitled, "The Coming Decade in the Rubber Industry," and was moderated by C. F. Ruebensaal, director of commercial planning, Texas-U. S. Chemical Co. Members of the panel were Paul W. Cornell, vice president, Goodrich-Gulf Chemicals, Inc.; William F. Tuley, manager, chemicals research and development, Naugatuck Chemical Division, United States Rubber Co.; and H. K. Hochschwender, president, Hochschwender & Associates.

Ruebensaal first pointed out that the coming decade should be one in which we shall see commercial planning and market strategy as dominant factors in determining our individual successful participation in the various burgeoning growth industries. He went on to emphasize that although the synthetic rubber industry had not shared the spotlight with plastics from the glamour standpoint, the production of the former had demonstrated a growth rate of more than 10% a year over the last decade, a figure that exceeds that of the chemical industry by a slight amount and is itself exceeded only slightly by the growth rate of plastics. Although it had been forecast recently that the use of synthetic rubber in this country was approaching a ceiling of about 65% of total new rubber consumption, this figure reached 68% in 1959 and even the most conservative forecasters concede now that it will exceed 75% of total new rubber consumption in 1965. Ruebensaal ventured the estimate that the figure will be closer to 80%.

Reference was made to a talk, "The Challenge of Marketing Rubber in the Coming Decade," by A. K. O'Keefe, president, Texas-U. S. Chemical, about a year ago, and revised reprints were distributed at the meeting. Per capita usage of total new rubber, synthetic rubber, and the percentage of synthetic rubber used by the United States and several other countries throughout the world in 1957 and 1959 were used to demonstrate the growth potential of



Moderator Clayton F. Ruebensaal (second right) and panel members for "The Coming Decade in the Rubber Industry"; Herman Hochschwender (far left), Paul W. Cornell, and Wm. F. Tuley (far right)

rubber and synthetic rubber worldwide. Although there is growing synthetic rubber production capacity abroad, it was estimated that U. S. exports in 1960 would amount to 350,000 long tons and remain at about 200,000 tons in 1965.

Ruebensaal mentioned the growing confusion with regard to whether or not many of the polyethylenes, polyurethanes, ethylene-propylene or polybutene elastomers overlap on natural and synthetic rubbers' markets, and whether they will be catalogued as synthetic rubbers or plastics. The problem of proper classification of these and other new materials must be solved in the near future, he added.

The panel moderator concluded his remarks with a review of the new specific areas in transportation and non-transportation uses for rubber that will provide large-volume outlets for rubber in the coming decade.

"Developments in Polymer Types—Forecasts for the Coming Decade," was the title of the talk by Dr. Cornell, of which Kendall Greene, of Goodrich-Gulf, was a coauthor. In connection with SBR's, it was predicted that the concept of oil masterbatching in the future will involve not only the desire to provide a cheaper rubber through oil extension, but that an attempt will be made to come closer to the properties of natural rubber through the incorporation of more expensive extender oils. In addition, it is anticipated that SBR's, with or without oil extension, will become available with lower heat build-up and with better building tack.

SBR-carbon black masterbatch production made with finer particle size blacks is on the increase since new latex dispersion methods have removed the limitation imposed on the dispersion of these blacks by dry mixing while at the same time providing improved physical properties in the vulcanizates. As new carbon blacks come on the market, and, in particular, blacks which cannot be handled in conventional mixing equipment, the polymer manufacturers will develop new rubbers to take advantage of the new and unusual properties of these blacks,

it was further declared.

Another obvious improvement for the 1960's is the development of black masterbatch in crumb form, which would permit increased automation of the rubber products manufacturing plant.

Cornell predicted that new types of emulsion polymers with perhaps a third monomer or possibly with the substitution of low-cost isoprene or piperylene will become available within the next few years. He said new emulsion polymerized SBR's with lower hysteresis will extend the use of SBR into heavy-duty tires and predicted better cure properties so that mixtures of SBR and natural rubber can be cured under conditions optimum for both. Also, in the field of emulsion polymerization he expects rubbers with better tack to facilitate automated and high-speed manufacture of rubber products, and rubbers with higher gum tensile strength to permit cheaper foam and sponge products.

In the latex field, an extension of the improvement resulting from latices of larger particle size should result in types which will permit higher loadings and thus less polymer use per cubic foot of finished product.

In connection with the synthetic polyisoprene rubbers, it was pointed out that when the commercial plants for the production of these rubbers are operating smoothly, the research and development effort will be directed toward improvements in them since no longer will it be adequate to match tree rubber, but rather attention will be directed toward improving those properties which the rubber products manufacturer finds are of importance to him.

This speaker said it is almost impossible to predict what the future holds for the unusual and outstanding *cis*-polybutadiene rubbers. Efforts are now directed toward adapting the use of this type of rubber to existing processing machinery, but it was suggested that new machinery ideally suited for *cis*-polybutadiene would be developed. Also, the superior abrasion resistance of *cis*-polybutadiene may be improved further by changes in the polymer, in

the reinforcing agents used, or in the handling techniques. In addition, its higher rebound and air diffusion rate through the polymer offer a challenge to the ingenuity of the rubber consumer.

Ethylene-propylene rubber has the major drawback of requiring a cure system entirely different from that which most rubber products now employ, but it was felt that research will provide a cure system which will make olefin rubbers, including low isoprene content butyl rubbers, most attractive.

In conclusion, Cornell said that the overall impact of these new developments will be to give the rubber products manufacturer an increasing list of polymers from which to choose for each of his products. SBR or modifications will continue to be the lowest-cost synthetic rubber, but improved quality will be available. Natural rubber users will find within the next two years that they have several synthetic types available at about 35¢ per pound which are equal to or better than natural rubber, and improved SBR and related types, some of which will probably be priced higher than the present 24.1¢ per pound delivered, but still considerably below the present natural rubber price.

No attempt was made to forecast the exact date and extent of penetration of these newer synthetic rubbers into the consuming industry because of the complexities of the international rubber industry, and then there is the major unknown of the question of the acceptance of these new synthetics by the rubber products industry and the end-user himself, it was said. A remarkable group of new materials for which the rubber producers have high hopes will soon be available, but years of testing and use will be required before full acceptance is obtained. The speaker expressed confidence, however, that the end of the 1960's will see synthetic rubbers taking, by far, the highest share of the market in their history.

"Future Developments in Rubber Chemicals and Vulcanization Methods"

was the subject of the talk by Tuley. The annual cost for research in the area of rubber chemicals and vulcanization methods can be roughly estimated at between \$2 million and \$5 million a year, which means that between \$20 and \$50 million will be spent for such research in the 1960's, it was said. It was estimated that there is an elapsed time of at least five years from the research stage to the establishment of a given material as a commercial product.

Synthetic plastic materials have, in recent years, been adopted for many products formerly made only from rubber, and this situation has introduced many new types of chemicals never before seen in a rubber factory.

Sulfur is now only one of the many

types of chemicals that can cross-link elastomers; several others, such as quinone dioximes, peroxides and hydroperoxides, and polymethylol phenol resins are now in commercial use and provide vulcanizates with better aging and other properties. Some of the synthetic elastomers respond more effectively to these non-sulfur cross-linking agents than does natural rubber. In addition, they are being used with some plastics, e.g., polyethylene, to increase toughness and serviceable temperature range.

A considerable extension of the use of non-sulfur vulcanizing agents is expected in the 1960's by virtue of the discovery of new materials and more knowledge of how to use them.

The trend in the rubber industry is toward higher curing temperatures in order to increase productivity, and interest in the effects of such high temperatures on elastomers and curing systems has grown. SBR has been shown to develop better properties than natural rubber when cured at 350° F. and above. The need exists, however, of better quality of products and less critical controls with high-temperature curing. Non-sulfur curing systems, because they provide a broader time and temperature range, may get more attention, and other new developments may be expected, it was said.

Dispersion of chemicals and pigments in rubber is attracting increasing attention both from the technological and economic aspects, and emphasis is being placed on making insoluble powders free-flowing and non-dusting for handling in automatic equipment, and surface treatments are being used to aid wetting or incorporation and dispersion. Further improvements are to be expected within the technical and practical economic limits.

A great variety of antioxidant chemicals of increasing effectiveness has come into commercial use, and in the last decade certain types of organic chemicals have been found to have a specific action against ozone attack on rubber. New antiozonants will be discovered and used commercially in the present decade.

Tuley concluded his talk with some comment on the Food Additives Amendment of 1958 and the Delaney Amendment prohibiting the use of carcinogenic materials in food and the problems these laws posed for the manufacturers of rubber products. Probably not more than 2% of all rubber products are involved, but the annual market for these products amounts to about \$100 million.

The Rubber Manufacturers Association, Inc., has established a subcommittee to represent the industry in dealing with the Food & Drug Administration. Eventually, more toxicological information on rubber compounding ingredients may be required, and suppliers of these materials have made available all of the data on hand. The

situation goes beyond the question of ingredients incorporated in the rubber compound, however, because of the chemical reactions and interactions which may change the identity and quantity of many added ingredients. Literal compliance with the law is complex, but there is optimism that the difficulties will be resolved, Tuley said.

"Projected Advances in Rubber Processing" was the subject discussed by Mr. Hochschwender. G. V. Kullgren, vice president, Hale & Kullgren, Inc., was coauthor of this paper. In it attention was focused on a tire production plant of the 1970's and the management philosophy that will be required to operate a plant which would incorporate the maximum of mechanization and use of electronic computers as planning instruments. In many instances the equipment, both electronic and mechanical, which is characterized in this plant is available today and can be found in isolated departments in a variety of plants all over the country.

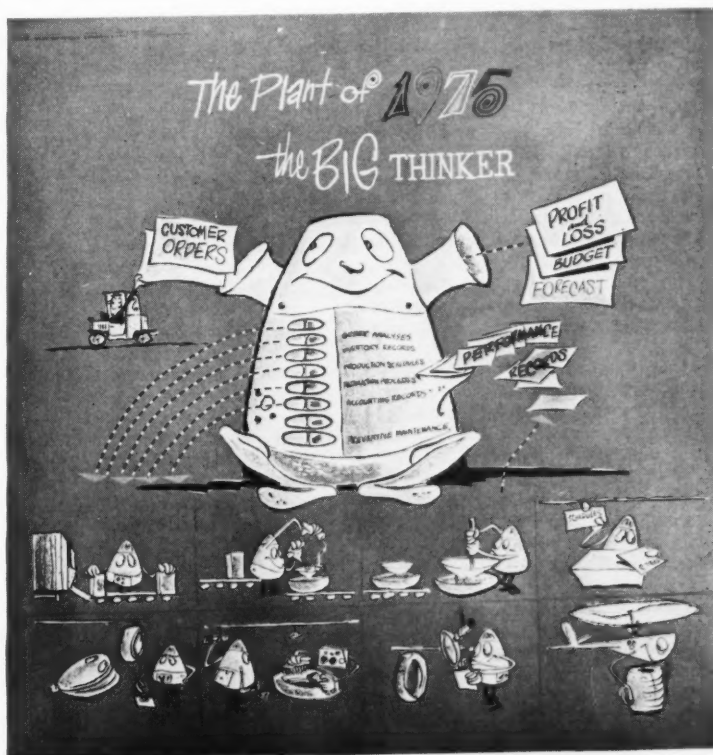
Overall planning is handled by a general-purpose computer in the main office called "The Big Thinker" which processes each order and supplies information whether the order can be shipped from inventory or a production run made, while at the same time preparing production schedules for each of the areas of the plant.

The mill room of the plant will have

its mixers completely controlled by electronic scheduling equipment, and many of the ingredients have been previously incorporated into the rubber in the synthetic rubber manufacturing plant. The remaining additives, such as sulfur, accelerators, antioxidants, etc., will be combined into a masterbatch of paste-like consistency to facilitate metering through fluid pumps. Mixing of the tire stocks will be done in tandem with the calendaring and extruding operations.

Stock changes will be synchronized with the requirements of the calender by an electronic computer. Fabric would be delivered to the system from mechanized storage, with selection of the material being made in response to impulses from the special-purpose computer, and similarly coated fabric would be bias cut into servicers in tandem with the coating calender.

Mixing of tread stocks will be performed in tandem with the extruder in the same manner as for the calendaring operation, but some additional features, such as an adjustable contour forming die with the contour control of the tread shape being subject to impulses from the computer, will be found. Continuous measurements and control of stock plasticity and temperature, automatic booking and storage of treads into an electronically dispatched conveying system to deliver the proper tread to the proper building machine at the proper instant that it is required



The Plant of 1975—The Big Thinker

will also be found. As an added refinement, it is entirely possible there would be a good system for injection molding the tread and sidewall to the carcass in the curing mold, which would eliminate the contour dies on the tread line and require simply a slug or strip extruder.

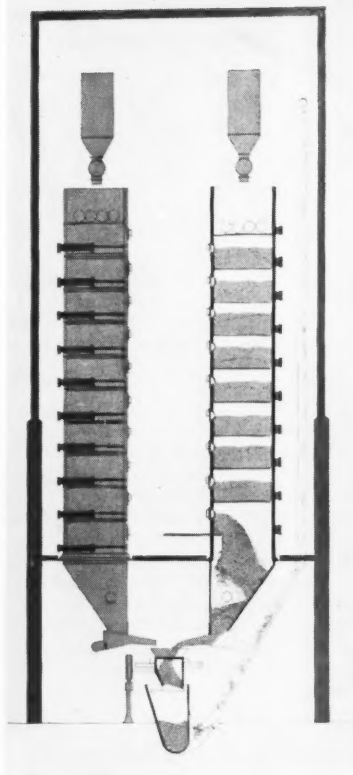
The common use in plants of the future of the unattended automatic tire building machine is expected. Preloaded servicers would come from the calendering process; treads would be supplied from the tread magazines, and the other materials from preloaded magazines arranged for electronic dispatch. A moderate amount of in-process inventory would be required at this point, but it will have been exactly predetermined as to product mix and will be completely in balance as to the differential in the production cycle of the preparation and assembly machinery.

Further refinements of our most modern green-tire storage and transport system can easily be visualized to permit computer control handling of all green tires for curing, it was said. Storage would be located behind or next to the presses with an indexing system, and the press will reach out with an arm to load and unload itself. The curing press of 1960 needs little further refinement to permit computer controlled operation, and, here again, the storage and the amount of space required will be predetermined by the computer in terms of the sales demand on the plant for the particular area which that plant is servicing.

Continued progress in mechanization will permit the plant of the future to include automatic finishing, inspection, packing, and warehousing, and the mechanized warehouse will fill sales orders in response to impulses initiated from suitable computer inputs.

Production and delivery lead times will be reduced in the factory of the future and in the distribution system by about one-half to three-fourths; the whole plant will be a line production process; there will be practically no in-process inventory; and top management will have to set goals for the sales department and the individual production department in such a way that these people can make decisions at the operating level on a sound overall company interest basis.

In conclusion, it was pointed out that from the purely technical manufacturing equipment standpoint in the rubber industry, we are almost ready for this plant of the future. From the standpoint of electronic data processing, it is simply necessary to obtain a greater understanding of the capabilities of the computers which we now have or are capable of constructing. It is in the phase of management thinking with reference to the concepts of organization and management philosophy that there is the most serious lag. Until organization practice catches up with



Stack bin for handling rubber pellets

technical developments, the most efficient integration of our modern technical equipment and our modern computers in our plant of the future will not occur. The development of the management concepts necessary to operate the plant of the 1970's is the phase



Peter Katsenis

which requires the most extensive planning and the hardest work this speaker concluded.

Butyl Insulation Forum Part of AIEE Meeting

A symposium on butyl rubber insulations will be held as part of the Fall, 1961, meeting of the American Institute of Electrical Engineers in Detroit, Mich. R. E. Hoy, chairman of the planning group, announced. The symposium is the Institute's second on butyl insulations. The first was held in 1955.

The symposium will include reports on a nationwide survey of field experience with butyl insulations to be conducted over the next six months among utilities and industrial and commercial users. Also to be covered is a report on progress in the manufacture of improved and higher-voltage butyl insulations since 1955, and case histories of special installations.

Further details can be obtained from Hoy, who is with Enjay Chemical Co., a division of Humble Oil & Refining Co., New York, N. Y.

Katsenis Wins Tlarki RUBBER WORLD Award

The first annual RUBBER WORLD award for the best work in the course, Rubber Technology Laboratory I, sponsored by the Tlarki Rubber Technology Foundation at the University of Southern California, has been won by Peter Katsenis. This award which carries an honorarium in the amount of \$100 was established to stimulate interest in rubber technology.

Mr. Katsenis was born in Greece and came to the United States in the Fall of 1953 on a student visa. He attended, first, Los Angeles City College and then the University of Southern California, from which he received his B.S. degree in chemical engineering in 1959.

After a short time in industry with the Don Baxter Laboratory, Mr. Katsenis returned to USC for work on a master's degree in chemical engineering. He specialized in rubber technology and worked on the ozone resistance of neoprene vulcanizates on a contract for E. I. du Pont de Nemours & Co., Inc.

Mr. Katsenis is now employed by the B. F. Goodrich Chemical Co. at Avon Lake, O. He intends to remain in the United States and will receive his citizenship papers in 1963.

We extend our congratulations to Mr. Katsenis on winning the RUBBER WORLD award and wish him continued success in his work in the rubber industry.

Rubber & Plastics Division, ASME, Plans Extensive October Meeting

The Rubber & Plastics Division, American Society of Mechanical Engineers, has scheduled a special conference to be held jointly with the Erie, Pa., Section of ASME at the Lawrence Hotel, Erie, Pa., October 9-11. There will be several special features with this conference, including an Early Bird Party on the evening of Sunday, October 9, for early arrivals; a conference luncheon on Monday, October 10, at which Turner Alfrey, Dow Chemical Co., an outstanding scientist, author, and lecturer will be the main speaker; and the keynote address which will be delivered on Monday morning by C. Howard Adams, of Monsanto Chemical Co., and 1960 chairman of the Division.

There will be plant trips to Nosco Plastics, Hammermill Paper Co., and Molded Fibreglass. On Monday evening a barbecue will be held at the Kahkwa Country Club for those attending the meeting. The Erie Section of ASME has also planned a full round of activities for the wives during the conference.

Of the six technical sessions scheduled, three will deal with rubber and three with plastics. The titles of these papers and their authors are given in the program which has been announced as follows:

Erie Conference Program

Monday Morning, October 10 Session I—Plastics

Novel Design in Sandwich Structures. C. Marshall, Hexcel Products, New York, N. Y.

New Apparatus for Study of Mechanical and Electrical Properties of Plastics. S. M. Skinner and E. L. Kern, Case Institute of Technology, Cleveland, O.

Reinforced Plastic Films as an Engineering Material. Johan Bjorksten, Bjorksten Research Laboratories, Madison, Wis.

Plastic Pipe for Industry and the Home. L. L. Loudin, Jr., Marbon Chemical Division, Borg-Warner Corp., Washington, W. Va.

Monday Morning, October 10 Session IA—Rubber

Processing Equipment for Liquid Urethane Elastomers. J. A. Hanzel, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Presses in the Rubber and Plastics Industry. Everett Perlberg, Adamson United Co., Hackensack, N. J.

Automated Tire Curing Room. L. E.

Soderquist, McNeil Machine & Engineering Co., Akron, O.

A New Visco-Elastic Compound for the Suppression of Noise and Vibration in Structures. C. H. Peterson, Lord Mfg. Co., Erie.

Magnetic Rubber, A New and Useful Material. R. J. Webster, Denman Rubber Co., Warren, O.

Monday Afternoon, October 10 Session II—Plastics

Air Structures—A New Concept in Engineering Design. Walter Bird, Bird-air Structures, Buffalo, N. Y.

Thermoforming—Its Processes and Applications. J. R. Lynch, Dow Chemical Co., Midland, Mich.

Letter to the Editor

July 19, 1960

DEAR SIR:

In the April issue of RUBBER WORLD there appeared an article which might be misconstrued to mean that neoprene is not suitable for high-temperature cures in the range 400 to 500° F. ("Contrasts in the Response of Elastomers to High-Temperature Vulcanization," page 89.) The neoprene compounds tested by the author had low elongation when cured at temperatures above 350° F.

We recognize that the author was talking about tire compounds, and we have no quarrel with the specific data he presented. We also appreciate that he did not generalize from his data. However, a reader might generalize and conclude, wrongly, that poor heat stability is characteristic of neoprene.

The fact is, neoprene wire jackets have for years been cured at about 400° F., and more recently it has become commercial practice to cure neoprene extrusions at temperatures up to 500° F. The latter refers to the process for extruding and curing continuously, using a high-temperature liquid bath for vulcanization.

To get the heat stability required in these high-temperature cures, the compounder should: (1) Use an antioxidant. This is essential. (2) Use an organic accelerator and no sulfur; sulfur is detrimental to heat resistance. (3) Use a W type of neoprene rather than a G type, because the G types are sulfur modified.

E. C. FETTER

E. I. du Pont de Nemours & Co., Inc.
Elastomer Chemicals Department,
Wilmington, Del.

Adhesion Theory. J. E. Rutzler, Jr., Case Institute.

Stress-Strain Relations in Cross-Linked Polyethylene. I. L. Hopkins, Bell Telephone Laboratories, Murray Hill, N. J.

Tuesday Morning, October 11 Session III—Rubber

The Analog Computer and Its Application in the Rubber and Plastics Industry. Adolph Katz and Paul Berthiaume, Princeton Computation Center, Princeton, N. J.

An Introduction to Biaxial Stress Problems in Fabric Structures. A. D. Topping, Goodyear Aircraft Co., Akron.

Fabric Space Structures. J. T. Harris, Goodyear Aircraft.

Elastomers as Structural Materials. E. E. Thielker, Du Pont.

Engineering Planning and Design Requirements for the Handling of Collapsible Rubber Containers. Neuberger Brown, OTD Container Corp., Warwick, R. I.

Tuesday Morning, October 11 Session IIIA—Plastics

Design Strength Data and Calculation for the Long-Term Use of Thermoplastics. W. D. Harris, Dow Chemical Co.

The Resin Stress Distribution of Reinforced Fibers. J. O. Outwater, University of Vermont, Burlington, Vt.

Obtaining Stress Percent Compression Diagrams of Foamed Plastics at High Rates of Compression. R. C. Dove and W. E. Baker, University of New Mexico, Albuquerque, N. M., and C. D. Beaman, Maracaibo, Venezuela.

Annual Review of Engineering Developments in the Plastics Industry. George Jackson, Monsanto Chemical Co., Springfield, Mass.

Tuesday Afternoon, October 11 Session IV—Rubber

Dracone—Flexible Barges—Some Problems of Design Materials and Construction. Warburton Hall, Ministry of Aviation, London, England.

Elastomers Applied to Structural Damping. Bruce Campbell, Lord Mfg. Co.

Automotive Engine Mount Design. A. L. Everitt, Inland Mfg. Division, General Motors Corp., Dayton, O.

Elastomeric Gyro Suspensions. J. W. Gwinn, Lord Mfg. Co.

Polyester and Hypalon Films to Plywood. Wilkinson, C. A. Litzler, Cleveland, O.

washington report

By JOHN F. KING

FTC and Congress Consider Stricter New TBA Marketing Rules for Future

The long and often bitter fight between the production and marketing arms of the rubber industry has broken into the open again. The Federal Trade Commission in late June held a series of hearings on a crucial aspect of fight over TBA—tires, batteries, and accessories—and just before its recess for the national political conventions in July, Congress reopened the issue with an eye to writing some tough new legislation.

While the House Foreign & Domestic Commerce Committee hearings on new restrictive legislation probably will come to nothing, the FTC's consideration of the case could very well produce some stringent new rules under which the major oil companies may market the products of rubber companies through their nationwide retail outlets.

FTC Hearings

The full FTC Commission heard arguments on a decision by one of its examiners, Edward Kolb, that the major oil firms had "coerced" their retail systems to market the TBA items of favored rubber companies. His recommended decision, however, excused the major rubber firms, which were named in the original FTC complaint, on grounds that the commissions they paid the oil firms for "sponsoring" their TBA products on a favored basis were a legitimate payment for services rendered.

In the cases heard by the Commission in late June, however—the Texaco-Goodrich commission arrangement, the hookup between Atlantic Refining and Goodyear, and Shell's commission arrangements with both Goodyear and Firestone—FTC trial attorneys asked that Kolb's exoneration of the rubber companies be overturned.

They argued that the "sponsoring" of rubber companies' TBA by the major oil firms should be ruled altogether illegal. The rubber firms are not simply purchasing "services rendered" with their commission payments, but "mas-

sive economic power" over retail distributors, they said.

The Commission trial attorneys also argued that FTC should forbid oil companies from buying TBA under their own brand names for retail sale, feeling that this "purchase-resale" approach, such as exists in the Standard Oil-Atlas TBA setup, discriminates against independent TBA distributors. The government's trial attorneys said that as long as the major oil companies are in the TBA business, retail dealers will be "coerced" with threats of loss of lease, and independent TBA distributors will be discriminated against.

The oil company respondents in the case argue privately that because they have such a heavy capital investment in lessee stations, they have a right to select which TBA items they prefer to market, and under arrangements with whichever suppliers they find most profitable. The respondents' on-the-record reply to FTC, however, was to deny the coercion charges by the Commission's staff and to stress the independence of their lessee-retailers to buy TBA items where they pleased.

House Committee Hearings

While the Trade Commissioners went behind closed doors to cogitate the mer-

its of the case, the House Commerce Committee gave Rep. James Roosevelt (Dem., Calif.) a hearing on his bill to curb TBA activities by integrated suppliers. The Californian, who as head of a Small Business Subcommittee has long championed new laws to "protect" the dealers from their lessor-suppliers, said his bill "simply provides that no producer who sells gasoline at wholesale for ultimate resale at retail shall act as agent for or receive any commission" for handling TBA. Opposing the legislation were spokesmen for the major oil companies, Firestone Tire & Rubber Co., and the Departments of Justice and Commerce. The bill is not expected to get anywhere until the next session of Congress, if then.

The same House Commerce Committee also took testimony on a bill by Rep. Wright Patman (Dem., Tex.) and 20 other House members to tighten up the Robinson-Patman Act. Eugene Z. Dubose, representing The Rubber Manufacturers Association, Inc., said the Patman bill would only compound the legal confusion about the Robinson-Patman Act and should be killed. Dubose claimed the bill would stifle competition, disrupt orderly marketing, and, by inadvertence, enact into law the much criticized "fair trade" bill, S-11, fought over in Congress for years.

Industry Protests Further Cuts In Tariffs on Rubber Goods

The rubber industry, which has been making quite an issue of competitive imports of various rubber products this year, finally made its complaints official when it protested to two government hearing panels against any further tariff reductions on rubber goods. The complaints were made in briefs filed with the Tariff Commission and the Committee for Reciprocity Information

(CRI), which are doing the groundwork for the international tariff negotiations the U.S. will join in this fall. Industry protests will be followed up by industry witnesses appearing before the hearing panels later this summer.

Under the procedure followed by the government in preparing for the negotiations under the General Agreement on Tariffs and Trade (GATT), the Tariff

Commission hears arguments before setting the "peril-point"—the point below which U. S. duties may not be cut in the negotiations—and the interdepartmental CRI listens to industry advice on which foreign tariffs this country will seek to cut in exchange for U. S. duty reductions.

A brief filed June 24 by George Flint, secretary of the Rubber Manufacturers Association, asked the panels to delete a number of so-called "basket" tariff categories, in which rubber goods may be involved, from the list of goods this country is willing to offer tariff cuts on.

Flint complained that the short notice given the industry to prepare its case precluded rubber firms from providing specific information on the impact of duty cuts contemplated by the government, particularly in the catch-all, vague "basket" categories. But he argued that present duties on a wide range of rubber products already are below the "peril point" and do not now give adequate protection to U. S. rubber goods producers. He said the differential between U. S. and foreign wages made present tariffs ineffective as it is.

Flint's brief to CRI also complained about foreign discrimination against U. S. exports of rubber goods. He said,

for example, that a number of American tire manufacturers which have no affiliations in Canada are seriously disadvantaged by the 22½% Canadian tariff on tire imports when they try to compete north of the border. He urged the U. S. to seek a cut in Canada's tire duty at the GATT talks.

Flint repeated rubber industry complaints that U. S. tire companies do not obtain enough of the foreign aid business contracted out by the International Cooperation Administration, and said the government should provide stronger support of U. S. rubber exports to help American firms compete with manufacturers in England, West Germany, Italy, Japan, and other countries. A specific recommendation he made here was for the government offer to cover the commercial risk of exporting abroad in addition to the political risks against which it now insures United States exporters.

A plea similar to Flint's, but more specific, is expected to be filed with the Tariff Commission and CRI shortly as a result of a resolution adopted by RMA's Rubber Sundries Division at its June 28 meeting at Skytop, Pa. The Division voted to request a freeze in the current 10½% duty on rubber glove imports and cuts in foreign tariffs on U. S.-made sundries.

millions to General in royalty and licensing rights, it could also mean a great big legal headache. Patent experts say the situation is ripe for an "interference proceeding" whereby General's claim could be held up pending the solution of the legalities of the U. S. Rubber case, which "interferes" with General's clear right to a patent on oil-extended rubber for automobile tires.

In cautioning against any automatic assumption that Holtzoff's decision in favor of General means a windfall for the company, one patent technician put it this way:

"There are a lot of very delicate concepts involved in this case. A lot of litigation remains to be gone through, more than likely."

Eximbank Extends Loan To Goodyear/Argentina

The Government's Export-Import Bank will lend a Goodyear Tire & Rubber Co. subsidiary in Argentina \$1.8 million to expand its tire plant near Buenos Aires. The credit to Neumaticos Goodyear, S.A., will be used to purchase in this country mold equipment, power equipment, and other manufacturing items to increase its production of auto and small tract or tires and tubes.

A previous loan of \$1.5 million was made by the Export-Import Bank to Neumaticos Goodyear in 1959 in connection with an earlier expansion program, and the new \$1.8 million credit represents an extension of that loan.

Repayment is scheduled over a period of five years.

Lengthy Litigation Seen Before Any Final Patent Granted on OE-SBR

The government has all but decided to forego an appeal of a Federal District Court ruling June 10 giving General Tire & Rubber Co. patent rights on oil-extended synthetic rubber for use in automobile tires. A decision by the Justice Department to drop out of the case—it argued in District Court against grant of the patent to General—by no means clears the way, however, for the Akron firm to obtain exclusive rights on production of oil-extended rubber going into auto tires.

General may find itself involved in more lengthy litigation with the Patent Office over the rights if the same Federal Court should rule in favor of United States Rubber Co., which has a similar suit for oil-extended rubber rights pending against the Patent Office.

Haywood Brown, Justice Department trial attorney in the General case, told Rubber World that "I doubt very much if we'll appeal." He said the government is satisfied with the outcome of the case because all it was interested in was blocking General's original claims which covered the whole field of oil-extended rubber products.

During litigation before District Judge Alexander Holtzoff, the company withdrew its broad claims for patent rights

on the synthetic process, *per se*, and restricted its claim to oil-extended rubber going into auto tires. Brown said the original broader claim would have given General exclusive rights "on everything from tires to rubber bands" if granted by the court.

He pointed out that if rights are ultimately granted by the Patent Office, production of oil-extended synthetic tires by any firm would contravene General's patent. Brown said a patent grant would permit General to claim rights on all oil-extended synthetic which goes into automobile tire treads. He added that it probably would not affect truck and bus tires, since most of these are made from natural rubber.

It was learned that while Judge Holtzoff ordered the Patent Office to grant General the patent, the order was not unqualified. It would not oblige the Patent Office, for example, to issue a grant while other claims are pending. And the U. S. Rubber suit against the Patent Office now awaiting a hearing in District Court constitutes just that: a pending claim for patent rights on oil-extended rubber for auto tires.

Thus, while the Holtzoff decision could mean a potential bonanza worth

Talc, Soapstone Consumption Up

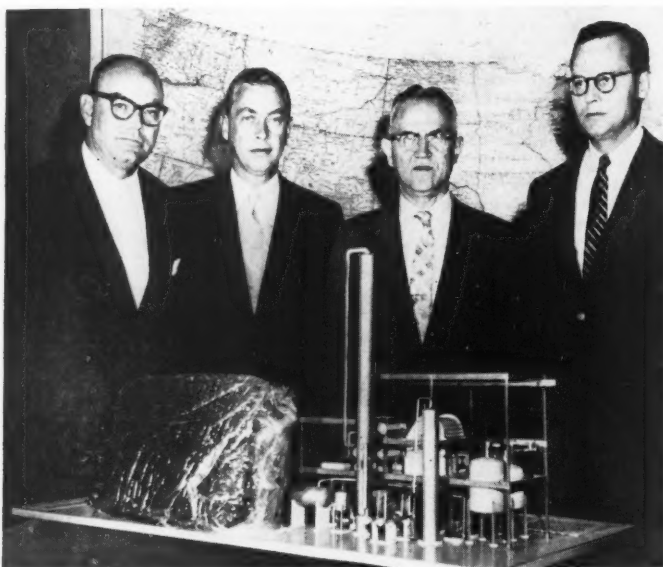
The rubber industry in the United States used about 25% more soapstone last year than in 1958, but had a lower consumption of pyrophyllite, according to figures in the latest report of the Bureau of Mines, United States Department of the Interior.

Consumption of talc and soapstone by rubber manufacturers totaled 30,728 short tons last year, against 24,431 long tons in 1958. A total of 11,459 short tons of pyrophyllite was consumed, compared with 12,458 short tons in 1958.

The report showed that 627,552 short tons of talc and soapstone were used by U. S. industry last year, contrasted with 550,741 short tons in 1958, and 145,851 short tons of pyrophyllite, against 143,151 in 1958.

Estimated world production of talc, soapstone, and pyrophyllite reached a record high last year of 2,400,000 short tons, against 2,000,000 short tons in 1958, because the United States, Japan, and Norway increased output substantially.

Stauffer and ASRC Join to Form American Rubber & Chemical Co. to Make cis-Polybutadiene



Officers of new American Rubber & Chemical Co. include: (left to right) Carleton Connor, Grant Thomas, H. Stauffer, A. Albright

Another entry into the production of stereo-specific polymers was announced on July 6. Stauffer Chemical Co. and American Synthetic Rubber Co. have formed a joint venture to be known as American Rubber & Chemical Co.

A multi-million-dollar plant will be built at Louisville, Ky., which will be capable of producing both polybutadiene and polyisoprene, but initial output will be primarily Cis-4 polybutadiene under license from Phillips Chemical Co. Construction is to begin at once, with completion scheduled for September, 1961. The plant will be located adjacent to the present American Synthetic Rubber Co. SBR plant.

The plant location will enable it to take advantage of the present ASRC operating staff, to obtain raw materials from local sources, and to be close to major rubber consumers.

The plant will be put on stream with a capacity of 30,000 long tons per year, but will be designed for easy addition of extra production units to raise the production total to 50,000 tons.

Officers of the new company include

Hans Stauffer, president of Stauffer Chemical Co., who is board chairman; president is Grant Thomas, president of ASRC; vice president is Archie Albright; secretary, Carleton S. Connor; and Tolman G. Everett, treasurer. Members of the board of directors are: Messrs. Stauffer, Thomas, and Albright plus James Kettle, David Bernstein, and Everett Morss.

The parent companies each own 50% of the new company. Stauffer's engineering department will be responsible for constructing the plant. ASRC will manage commercial production and marketing. Both companies will staff the pilot plant and research laboratories which are to be part of the project.

The move marks the entry of Stauffer Chemical into the polymer field and is in line with a desire toward diversification. Stauffer is one of the 10 largest chemical companies in the United States; its previous major corporate moves have been mergers with other chemical companies rather than into fields such as rubber.

For ASRC the move is a logical ex-

tension of its activities into the stereo regular polymer field. ASRC was formed in 1955 to buy the government SBR plant at Louisville and is owned by 28 companies, most of which are small to medium-size rubber companies producing non-tire products.

This plant plus added capacity recently announced by Phillips will increase planned capacity for the two polymers in the United States to almost 200,000 long tons per year by the end of 1961. With several other companies considering building plants for production of these rubbers the total capacity over the next several years should certainly remove them from the experimental category and put them into the commercial class of synthetic rubbers.

Richardson To Use United Carbon Patents

Sid Richardson Carbon Co., Fort Worth, Tex., has completed licensing agreements with United Carbon Co., Inc., Houston, Tex., for use of United Carbon processes in manufacture of oil furnace carbon blacks.

The United Carbon processes will be used in a carbon black plant to be built by Richardson at Big Spring, Tex. Construction will begin late this summer and be completed by the middle of 1961, according to present plans. The plant, to make HAF and ISAF blacks, will have a capacity of 50 million pounds a year.

Richardson Carbon operates a large channel black plant at Odessa, Tex., and the projected plant marks its entry into the furnace black field.

The licensing agreements cover current and pending United Carbon patents and engineering design for production, processing, and packaging of the carbon blacks by Richardson. Also included are recently developed processes and equipment arising from United Carbon's research and development program.

United Carbon operates eight furnace and channel black plants in Texas, Louisiana, Kansas, and New Mexico. It also manufactures carbon black in Australia and Great Britain and is currently building a furnace black plant in France.



Henry L. Ford

Eastman Forms Unit For Sales Abroad

Tennessee Eastman Co. and Texas Eastman Co., manufacturing divisions of Eastman Kodak Co., have formed a new international division, responsible for sales of Eastman fibers, chemicals, and plastics in all countries except the United States and Canada.

Eastman Chemical Products, Inc., will continue as sales agent for these products in the United States and Canada, the announcement said.

Eastman revealed that the new division will include two new subsidiary corporations: one, Eastman Chemical International, A.G., which will handle sales in Europe, the Middle East, and North Africa, from headquarters in Zug, Switzerland, and a branch office in The Hague, Netherlands. The other, Eastman Chemical, Ltd., will have headquarters in Nassau, the Bahamas, and offices in Hong Kong. It will handle sales in Central America, South America, Australia, New Zealand, South Africa, and the Far East.

Henry L. Ford will be general manager of the international division. Guy A. Kirton, formerly sales manager of Eastman Chemical Products, Inc., has been named assistant general manager of the international division.

T. E. Vance has been named manager for Eastman Chemical International, A.G.; Wiley H. Weaver, manager at Nassau for Eastman Chemical, Ltd.; and Paul Glade, manager, Far East sales, for Eastman Chemical, Ltd.

RW Promotes Giunta

John P. Giunta, who joined the staff of RUBBER WORLD in December, 1958, as eastern sales representative, has been appointed eastern sales manager, according to Robert L. Miller, adver-



John P. Giunta

tising sales manager. Giunta's territory includes New England, New Jersey, and New York State.

With both a technical and advertising background, Mr. Giunta is well qualified to work with people to obtain the maximum effectiveness of advertising for the rubber industry.

A graduate of St. Peter's College in 1952 with a B.S. in chemistry, he joined the staff of Allied Chemical Corp., Hopewell, Va., as a chemist. He left Allied Chemical for two years to serve in the U. S. Navy. Then he returned to Allied Chemical Corp., in the plastic and coal chemicals division, and worked in the rubber research and application laboratory.

Mr. Giunta is a member of the American Chemical Society and the New York Rubber Group. During his off-hours he pursues hobbies of gardening and painting in his Ridgefield Park, N. J., home.

Nolan Named To Head New Sales Force

The chemical division of International Latex Corp., New York, N. Y., has developed its own sales force to be responsible for latex sales previously handled by outside agencies and has named Arthur Nolan, general sales manager, to head the new force.

The rapid increase in chemical sales has made it necessary for the company to develop its own sales group, according to Fred Andrew, executive vice president. Regional offices in the New England and Midwest areas will be established to add to the already existing ones in the mid-Atlantic and southern regions.

As general sales manager, Nolan will be responsible for world-wide sales of the synthetic latex and rubber manu-



Arthur Nolan

factured by the company for use in adhesives, paper coating, carpet and rug backing, and other applications. He will have his offices at the chemical development center, Dover, Del. Before joining International Latex, he was vice president of Latex & Rubber, Inc., which for the past three years was International Latex's distributor for Tylac latices in the mid-Atlantic area. Prior to that, he was with United States Rubber Co. as general sales manager for its natural and synthetic latices, and he has acted as consultant to various government agencies on latex needs.

In addition, W. A. Miller has been appointed manager of market research for the chemical division. He will prepare market survey studies on new products, patent investigations, and company and product acquisitions.

J. J. Barnes Retires

J. J. (Jack) Barnes has retired as vice president of Gates Rubber Co., Denver, Colo., after 31 years with the company. As vice president, he was in charge of two major divisions: original-equipment manufacturing and national tire sales.

Managing the warehouse in Chicago, Ill., was his first job after he joined the company in 1929. He remained in Chicago until 1936, when he was transferred to Denver to head a group of four departments: service, factory inspection, tread rubber, and the downtown factory store. In 1957, Mr. Barnes became manager of the national tire sales division, and later he was named to head the original-equipment division.

Mr. Barnes was invited to join the board of management in 1939 and became a vice president of Gates Rubber Co. in 1949.



W. P. Seiberling

Willard P. Seiberling Retires after 39 Years

Willard P. Seiberling has retired as secretary of Seiberling Rubber Co., Akron, O., after 39 years with the company. He will continue to serve as a member of the board of directors.

He began his career in the industry in 1915 at Goodyear Tire & Rubber Co., Akron, as manager of the aeronautic department. He joined Seiberling Rubber Co. in 1921, shortly after his father, F. A. Seiberling, left Goodyear to form the new company. His first position at Seiberling was as manager of accessories and repair material sales. He helped promote and develop puncture-sealing inner tubes. In 1944 he was named company secretary and six years later a director.

Mr. Seiberling's interest in aviation stems from 1909 when he witnessed the Wright brothers' trial flight demonstrations at Fort Meyer, Va. He once built a biplane glider and took part in several free balloon races.

He was born in Akron on June 28, 1892. He attended local public schools and was graduated from Lawrenceville Preparatory School and Princeton University.

Enjay Splits District; Opens New Office

Enjay Chemical Co., New York, N. Y., has split its former Mid-Atlantic district into two new ones: Mid-Atlantic and New York-New England. In addition it has established a new Mid-Atlantic district office at 1024 South Ave., Plainfield, N. J.

J. W. Laibe, former head of Enjay's contracts section, will manage the seven-state New York-New England area which has a district office in New

York and a sales office in Boston, Mass. A. H. Pflugh moves from assistant manager of the Mid-Atlantic district to become assistant manager, New York-New England.

H. W. Peterson continues as manager of the Mid-Atlantic district, which includes territory stretching from New Jersey to Florida. In addition to the new office, there is one at Charlotte, N. C.

The split is attributed to the increase in business and personnel. With two more manageable parts, the company hopes to provide improved service.

Committee D-11 Assigns A New SBR Number

Committee D-11 on Rubber and Rubber-Like Materials of the American Society for Testing Materials through Subcommittee 13 on Synthetic Elastomers has assigned a number to a new styrene-butadiene black masterbatch, 1609, which is manufactured by both The General Tire & Rubber Co. and Phillips Chemical Co.

DESCRIPTION OF TYPE OF STYRENE-BUTADIENE (SBR) ELASTOMER—
ASSIGNMENT OF NEW CODE NUMBER—
ASTM D-11 1419-56T

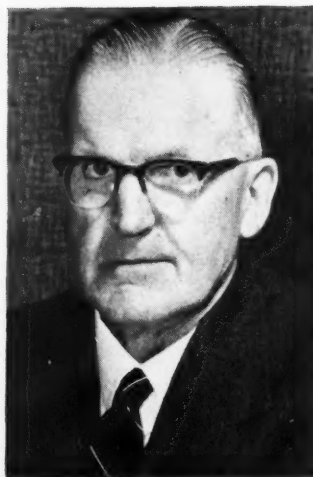
Number as assigned	1609
Date assigned	6/6/60
Requested by	General Tire & Rubber Co. Phillips Chemical Co.
Distinctive feature	SAF-dispersant free
Close previous number	Gentro-Jet 9152 Phillips 6604
Type	1600
Nominal temp., ° F.	43
Activator	FRA
Shortstop	ND
Catalyst	OHP
Antioxidant	ST
Emulsifier	RA
Nominal bound styrene, %	23.5
Conversion, %	60
Mooney viscosity, ML 1+4 (212° F.—compound)	61
Coagulation	Acid
Carbon black type	SAF
Phr.	40
Oil type	HI-AR
Phr.	5
Finishing	Normal

NOTE: Abbreviations and symbols are defined as follows:

FRA = free radical type, i.e., iron-pyrophosphate, peroxamine sulfoxylate.
HI-AR = highly aromatic.
ND = nondiscoloring.
OHP = organic hydro peroxide.
RA = Rosin-acid.
SAF = super abrasion furnace.
ST = staining.

Scott Testers Names Marsden British Agent

Scott Testers, Inc., Providence, R. I., has appointed Hermon Marsden, 78 Gatley Rd., Gatley, Cheshire, England, its exclusive British agent, according to David Scott, Jr., president. Mr. Marsden previously served as technical advisor to the Manchester branch of Leeson



Hermon Marsden

Corp. (formerly Universal Winding) and had charge of the Unisel Division, which handled the sale of Scott testing equipment throughout the United Kingdom. During the last 15 of his 22 years with the division, his efforts were directed to the application and sales of Scott Testers' physical testing equipment for rubber, plastics, textile, leather, and other industries.

Mr. Marsden served as an officer in both world wars. After his graduation from Leeds University he acted in various mill and technical capacities in the Yorkshire worsted industry where he helped develop processes for handling synthetic fibers. An author of many technical papers for leading trade journals, he has also lectured widely in the United Kingdom and other countries.

Phillips Expands Cis-4 Capacity

An increase of 5,000 long tons per year has already been announced by Phillips Chemical Co. for capacity of the Cis-4 (polybutadiene) rubber plant now under construction at Borger, Tex. Original plans called for a 20,000-ton-a-year plant, but consumer interest and demand made the additional capacity desirable. The 25,000-ton plant is expected to be in full operation in the fourth quarter of this year.

In addition to this direct production, Phillips has granted licenses for production of Cis-4 to an Italian company and to American Rubber & Chemical Co., a joint venture of Stauffer Chemical Co. and American Synthetic Rubber Co. Other American companies are also reported to be seeking licenses from Phillips.

Butadiene for the new plant will be supplied by Phillips Plains plant which is adjacent to the synthetic rubber plants.

**You Can Count on Rapid Incorporation . . .
Improved Dispersion With . . .**

AZO ZZZ-55-TT



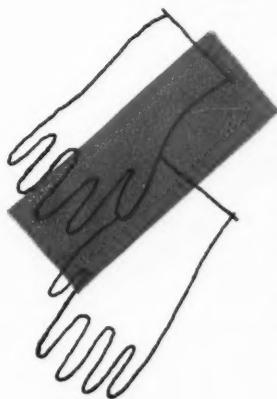
A Treated ZINC OXIDE For Use in Rubber

OTHER ADVANTAGES OF AZO ZZZ-55-TT

Faster curing
Safe processing
Improved scorch resistance
Lower acidity
High apparent density
Low moisture absorption
High tensile strength
Increased resistance to tear
Increased resistance to aging

NOTE:

AZO rubber grade zinc oxides
are also available as
AZODOX (de-aerated).
AZODOX has twice
the apparent density,
half the dry bulk.



AZO ZZZ-55-TT is heat treated in a controlled atmosphere that removes objectionable trace elements and enhances mixing and dispersion. In addition, it is treated chemically to improve mixing and dispersion properties to an even greater degree.

AZO ZZZ-55-TT is a general purpose, smooth processing zinc oxide. We can highly recommend it to users who desire a treated zinc oxide. May we suggest that you try it in your most exacting recipes. Samples on request.

**American
Zinc sales company**

Distributors for AMERICAN ZINC, LEAD & SMELTING COMPANY
COLUMBUS, OHIO • CHICAGO • ST. LOUIS • NEW YORK

G.E. Builds Silicone Intermediates Plant

General Electric Co. has begun construction of a nearly \$3-million plant at Waterford, N. Y., for the manufacture of basic silicone intermediate chemicals. The new plant will replace smaller existing facilities which will be converted to other needs, it was recently announced.

The new plant will add more than 15,000 square feet of manufacturing space to the Waterford site and is expected to go into operation late in 1961. It is planned to consist of a six-story outdoor-type manufacturing structure, a partial two-story control and general service structure, and a storage-tank area.

According to Jerome T. Coe, general manager of the silicone products department, the capacity of the plant will be increased to beyond 1965 anticipated requirements. One of the plant's features will be a closed-circuit television hookup for monitoring operations from a centralized control room.

The new construction is part of a 24-month, multi-million-dollar expansion program involving new structures, equipment, and processes. The program's first phase was a million-dollar silicone fluids finishing building which is expected to begin operations next November.

Chemicals to be made in the new plant are silicone intermediates which are processed into more than 250 salable forms of silicone, including silicone rubber, oils, fluids, resins, emulsions, and specialty products.

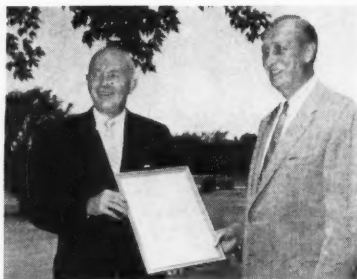
Phillips Erects Carbon Black Plant in India

Phillips Carbon Black, Ltd., a new company formed by the collaboration of Phillips Petroleum Co., Bartlesville, Okla., and Duncan Brothers & Co., Ltd., Calcutta, India, will construct a plant to manufacture carbon black near Durgapur, India.

The plant will have an initial design capacity of 22 million pounds of carbon blacks per year and is scheduled to be in operation within 18 months. It will use the Phillips Petroleum Co. furnace black process employing coal-tar distillates as the feedstock.

The new company is owned 30% by Phillips Petroleum, 30% by Duncan Brothers, and the remaining 40% is reported to have been oversubscribed 19 times by private investors at a recent public subscription in India.

J. W. Barber, formerly manager market evaluation and butadiene-butylene sales, Phillips Chemical Co., will be in charge of operations and sales for the new company, with offices in Calcutta, India.



Lee R. Jackson, right, vice chairman of the Firestone Tire & Rubber Co., Akron, O., receives a citation from The Rubber Manufacturers' Association, Inc., for outstanding service to the rubber industry over the past 45 years. The citation is presented by Ross Ormsby, Association president, at the organization's June board meeting in Akron. Mr. Jackson, who will retire as an RMA director at the end of the year, has spent 48 years in the rubber industry, all of them with Firestone.

S. V. d'Adolf Joins RUBBER WORLD Staff

Stuart V. d'Adolf has been appointed assistant editor on the staff of RUBBER WORLD to replace Richard E. Wening, who resigned to accept a position with Harshaw Chemical Co.

Mr. d'Adolf has a background of industrial writing for the Borden Co. public relations department as well as for newspapers in New Haven, Conn., Parkersburg, W. Va., and Ogdensburg, N. Y.

He attended James Monroe High



S. V. d'Adolf

School in New York, N. Y., and was graduated from the University of California at Berkeley, with a B.A. in economics and journalism in 1949.

A veteran of three years' Naval duty during World War II, d'Adolf is married and makes his home in New York.

Strike Hits Canada's Kaufman Rubber Co.

A strike against Kaufman Rubber Co., Ltd., Kitchener, Ont., Canada, began June 25 and was still going strong in mid-July. A 15¢-an-hour raise was at issue.

A. R. Kaufman, president of the company, was reported as saying that the company could not afford the raise unless the government provided tariff protection. He added that he would keep the plant operating and claimed that the strike meeting was attended by only 75 of the near 650 employees, and of these, only about 50 voted to strike.

Three men were charged with causing a disturbance on the second day of the strike when pickets tried to prevent employees from crossing the picket lines with the aid of city police. The three were arrested and later released on bail. Two more men were arrested the next day after a series of early morning scuffles. Pickets were able to prevent delivery of a car of coal on the third day when trainmen respected the picket lines.

While the company sought an injunction against mass picketing, William Punnett, assistant Canadian director of The United Rubber Workers, presented the union position in the strike to the Labor Minister's department. It appeared unlikely that the department would attempt to initiate negotiations unless there was a prospect of breaking the stalemate.

New Home for "Kel-F" At 3M Decatur Site

New and improved production facilities for "Kel-F" brand chemicals now produced in Jersey City, N. J., will be added to Minnesota Mining & Mfg. Co.'s plant under construction at Decatur, Ala.

This new plant will result in much increased production efficiency and service on the halofluorocarbon line of elastomers and plastics as well as dispersion coatings, greases, oils, and waxes. These products will share the plant with facilities for making "Scotchgard" stain repellers, another fluorocarbon chemical material.

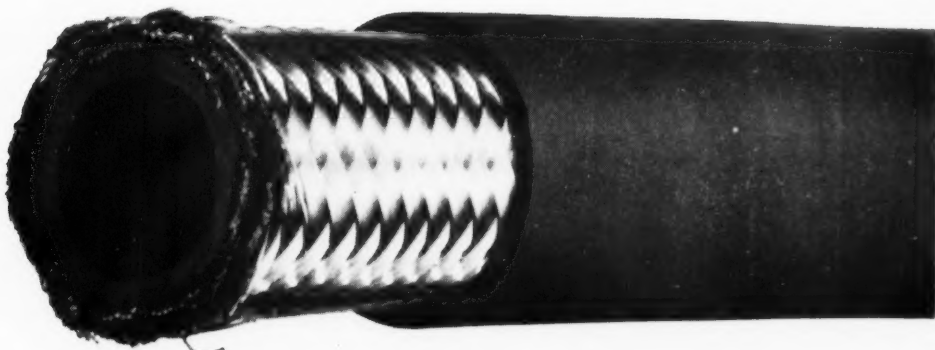
The new plant is expected to be in operation in the Spring of 1961, at which time the Jersey City plant will be closed, according to the announcement by J. W. Selden, vice president.

Better corrosion protection . . .

Better adhesion with rubber . . .

NEW NS ADPLY-A* WIRE

IN HIGH
PRESSURE HOSES ➔



IN TIRE BEADS ➔



*Trademark

National-Standard engineers have developed ADPLY-A wire for use in a variety of rubber products to provide twice the adhesion properties of present wire finishes plus as-good-as, or better, corrosion protection.

ADPLY-A is high-carbon steel wire coated first with zinc for good corrosion protection and then with brass for good adhesion, and is less sensitive to variations in rubber composition. This combination of double coating provides longer storage life, increased adhesion and corrosion protection for such applications as rubber hose reinforcing (where corrosion is a problem), and for aircraft tires. In fine sizes for high-pressure hose, ADPLY-A fulfills the need for a less-expensive wire than stainless steel, but with greater corrosion protection than liquor finish wire.

COMPARISON OF ADPLY-A WITH OTHER WIRE FINISHES

	ADPLY-A Adhesion	ADPLY-A Corrosion Protection
AP-1	Better	Same
BP Finish	Better	Better
Brass Finish	Same	Better
Liquor Finish	Better	Better

For complete information on new ADPLY-A wire from National-Standard, write to National-Standard Company, Niles, Michigan.



NATIONAL-STANDARD COMPANY
Niles, Michigan

news briefs

COLUMBIAN CARBON CO., New York, N. Y., is constructing a plant in the Houston, Tex., area to produce dispersions of carbon black in polyethylene, polypropylene, and other resins. The new highly automated facility is expected to begin operation in the fourth quarter of this year. It is designed for a capacity of about eight million pounds a year of cable and plastic pipe grade concentrate and will supplement Columbian's existing production at Tacony, Pa.

CELANESE CORP. OF AMERICA, New York, N. Y., made public its plans for a major expansion at the Pampa, Tex., plant for the production of higher acrylate esters. The planned facilities will have a capacity for annual production of more than 14,000,000 pounds of 2-ethylhexyl acrylate, butyl acrylate, and glacial acrylic acid. When expansion is completed, before the end of this year, the plant's overall capacity for acrylate production will have doubled. Water-based latex paints account for a large measure of the increase in acrylate consumption since 1954. Other growing end-uses include adhesives, paper and textile coatings, and rubber compounding where these acrylates provide a decorative finish as well as strength and wear resistance.

SIMPLEX WIRE & CABLE CO., Cambridge, Mass., has appointed The Heckerman Corp., Inglewood, Calif., to act as western representatives for applications of Simplex products in military systems and equipment.

J. O. ROSS ENGINEERING DIVISION, Midland-Ross Corp., New York, N. Y., will open a new sales office in Mobile, Ala. R. C. MacDuffee, formerly at Mt. Prospect, Ill., will head the new office, which has been opened to increase coverage and service in the South.

LINEAR, INC., Philadelphia, Pa., has appointed three new distributors to handle its seals and mechanical packings. Product Sales & Engineering Co., Chicago, Ill., will distribute Linear products in the Chicago area. Calkins Mfg. Co., Spokane, Wash., receives the franchise to handle Linear products in the eastern Washington area, and Intercontinental Aviation Services, Inc., Los Angeles, Calif., will act as export dealer in England, Germany, France, Belgium, and other European countries.

POLYMER CORP., LTD., Sarnia, Ont., Canada, and the O.C.A.W., which represents the plant and technicians' bargaining units, have signed new one-year contracts providing for an increase of 6-10¢ an hour. The settlement was reached shortly after the previous agreement expired.

BRISTOL MFG. CORP., Bristol, R. I., sponsored the telecast of the local Fourth of July parade on station WJAR TV as part of its twenty-fifth anniversary celebration. The two-hour program was telecast live direct.

HERCULES POWDER CO., Wilmington, Del., has named Thompson-Hayward Chemical Co., Kansas City, Mo., distributor for its "Pamak" tall oil fatty acids in all mid-continent states with the exception of Wisconsin, Michigan, and parts of Illinois and Indiana.

A solid propellant-type starter, slightly larger than a standard automobile filter, replaces huge storage batteries to start jet engines on the supersonic Republic F105-D fighter-bomber and enables it to be airborne in seconds instead of minutes in all climates. Olin Mathieson Chemical Corp., New York, N. Y., developed the cartridge for which Goodyear Tire & Rubber Co., Akron, O., created an extremely tough molded rubber case that seals the starter tightly into a cavity in the jet turbine.



THE DOW CHEMICAL CO., Midland, Mich., has announced the availability of technical-grade acrylic acid at a new low market price. The material is produced by Dow Badische Chemical Co., Freeport, Tex. In addition, full-scale production of polymerization-grade and esterification-grade acrylic acid is now in effect. Polymerization-grade acrylic acid is now priced at \$0.425/lb. TL and \$0.40 TC; esterification-grade acrylic acid is \$0.415 TL and \$0.39 TC.

REEVES BROTHERS, INC., New York, N. Y., has added Kel F-coated Dacron to its line of synthetic rubber-coated industrial fabrics. According to the manufacturer, the new product has high-temperature performance and a high resistance to aliphatic and aromatic hydrocarbons, ozone, acids, and alkalis. It is intended primarily for use as diaphragm and gasket material in controls for aircraft, heating units, and other equipment operating at high temperatures.

TYREX, INC., New York, N. Y., has changed its organizational structure to divide overall activities into two main functions: operations and administration. Steven B. Manning, director of operations, will supervise the planning and execution of the promotional program for Tyrex tire cord. Philip E. Robinson, secretary and director of communications, will head the administrative branch.

ARCHER - DANIELS - MIDLAND CO., Minneapolis, Minn., has given the name industrial chemicals division to its chemical products manufacturing operations, according to George K. Nelson, division manager. The division produces and markets Hydrofol fatty acids and glycerides, Adol fatty alcohols, Adogen fatty nitrogen compounds and vegetable fatty acids. The division will construct a new chemical center at Peoria, Ill.

A CUSHIONING CLINIC will be held from 9:00 a.m. to noon, August 27, at the thirty-second annual convention of the National Association of Furniture Manufacturers in Chicago, Ill. Representatives of major cushioning groups, including latex foam, cellular plastics, and cotton, will outline latest developments in their line and answer questions of manufacturers.



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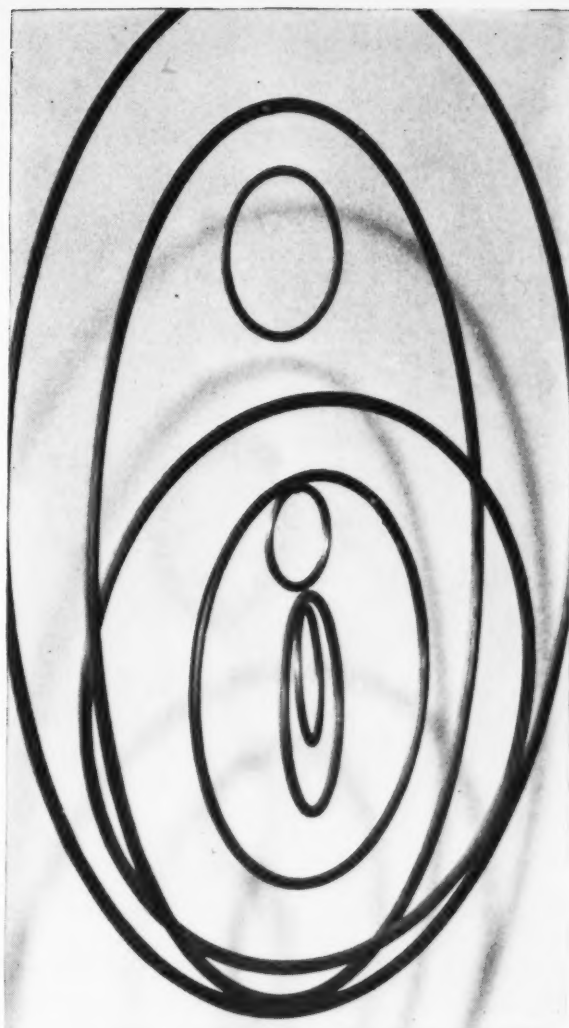
- ☐ Increase in speed of extrusion
- ☐ Minimize variation in die swell
- ☐ Better mold flow
- ☐ Reduce sticking to back roll
- ☐ Obtain higher loadings of compounds
- ☐ Absorb liquid plasticizers
- ☐ Inhibit "sweating out" of liquid plasticizers
- ☐ Reduce bloom
- ☐ Improve sunlight aging and ozone resistance

Laboratory-tested Factice, a vulcanized vegetable oil is available in three main grades: "WHITE", "BROWN", and "AMBEREX". The type of Factice should be chosen for a specific job as a certain polymer is selected for meeting definite specifications in the finished item.



Our well staffed laboratory will endeavor to answer your questions, as well as run laboratory samples on your suggested formulations. All formulas will be held in strict confidence.

The STAMFORD RUBBER SUPPLY CO.
Stamford, Conn.



WIRE-IN-RUBBER

... problem solved

In the photo above, you see many rings formed from steel wire. These are typical bead rings used in the manufacture of automatic air suspension systems for trucks, vibrating screens, etc.

National-Standard Company worked with the rubber companies, who manufacture such air-suspension systems, to develop equipment and forming methods that would meet critical tolerances. The result was low to high carbon rings (1 $\frac{3}{4}$ " to 14" diameter) formed from flat or round wire sizes .041" to .185".

This is the kind of engineering help in solving wire-in-rubber problems that you get from National-Standard. Call us in on your next project.



NATIONAL-STANDARD COMPANY
Niles, Michigan

news briefs

THE B. F. GOODRICH SPONGE PRODUCTS, LTD., division of B. F. Goodrich Canada, Ltd., Waterville, P.Q., has bought the chemical foam producing facilities of St. Lawrence Mfg. Co., Quebec City, P.Q. Reported plans are to transfer production of the chemically produced foam used in furniture and car upholstery to the Waterville plant in a few months.

DOMINION RUBBER CO., LTD., Kitchener, Ont., Canada, and members of United Rubber Workers, Local 67, at the Merchants Rubber plant, have agreed on a new one-year contract which provides for a 4¢-an-hour increase for men and 2¢ an hour for women.

DE HAVILLAND AIRCRAFT CO., of England, solved the problem of cracking and stiffening the natural rubber door and window seals on its Comet IV jets by painting them with UOP-288 rubber antiozonant mixed with alcohol. The antiozonant is produced by Universal Oil Products Co., Des Plaines, Ill. The door and window seals are necessary for keeping cabins of the jet aircraft pressurized, but the ozone found in large concentrations at the 35,000-foot cruising altitude of the aircraft was damaging the seals so badly, they had to be replaced within a few hundred hours' flight time.



Brig. Gen. Chester V. Clifton finds some relief from the sun in the shade of this giant tire, 10 feet high and four feet wide, made by the Firestone Tire & Rubber Co., Akron, O., for use on the Army's new Overland Cargo Carrier. The special tires make operation of this 13-car carrier possible over all types of terrain. Each tire requires only 10 pounds of inflation pressure when the carrier is fully loaded, only slightly more than 1/3 as much as the normal passenger-car tire



The Army "Barc," a giant amphibious troop and supply carrier, depends on four 9 1/2-foot high tires developed by The Firestone Tire & Rubber Co., Akron, O. Each tire with its tube and flap weighs 2,952 pounds, and according to Firestone engineers, the rubber used in the four tires would make more than 600 popular-size passenger-car tires. "Barcs" have been used by the Army Transportation Corps since 1952

KOEL-BAR INDUSTRIES, Chicago, Ill., has been formed as sales representatives in the Chicago area for Baldwin Rubber Co., Pontiac, Mich., Garfield Rubber Products, Garfield Heights, O., and Post Products Inc., Buchanan, Mich. Products include molded, extruded, and sheet rubbers, automotive and industrial sponge rubber, rubber chemicals and plastics, machined parts and details and assemblies.

NEW JERSEY ZINC CO., New York, N. Y., has established a district sales office in Atlanta, Ga., to provide improved service to its customers in the South. Robert W. Munson has been named southern district sales manager.

PLASTIC & RUBBER PRODUCTS CO., Los Angeles, Calif., is now offering silicone O-Rings which conform to standard AN and MS drawing dimensions and tolerances. The manufacturer announces that special compounding and processing methods have been developed to make possible direct substitution of silicone in these seal applications without the previously required special tooling.

LINEAR, INC., Philadelphia, Pa., has named three new distributors in western states to handle its seals and mechanical packings. Kindred Aviation Co., Burbank, Calif., will act as export dealer through Linear's Haskel Seals Division, Glendale, Calif. Landes, Zachary & Peterson Co., Denver, Colo., will be the agent for Haskel Seals in Colorado, southwestern Wyoming, New Mexico, and El Paso, Tex. Dascomp Aircraft Supplies, Seattle, Wash., will handle Linear exports to western Canada, Alaska, and Japan.

SHELL CHEMICAL CO., New York, has awarded a contract for expansion of its styrene production facilities at Torrance, Calif. R. C. McCurdy, Shell president, said the expansion, scheduled for completion early next year, will raise the plant's capacity to 210 million pounds of styrene a year. Shell acquired the synthetic rubber complex at Torrance from the United States government in 1955. At that time the styrene facilities had a capacity of 125 million pounds a year, McCurdy declared.



The only explanation I have is that he must be in the neoprene business—and knows that MAGLITE is the key to superior scorch protection.

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The performance-proved magnesium oxide

Want to eliminate scorch damage in neoprene processing? Specify MAGLITE D. Tests prove that it offers better scorch protection for neoprene than any other magnesium oxide you can use. MAGLITE D also helps solve storage problems since it occupies about one-third the warehouse space as many of the lightweight magnesi-
asias. The benefits of using MAGLITE K, M, or Y for other elastomers and certain product or process requirements are equally impressive. For samples and technical information write to



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WIRE-IN-RUBBER

... problem solved

In the cross section of tire tread shown above, you see hundreds of tiny pieces of .006" brass-plated, high-tensile, high-carbon steel wire. Cut to accurately measured lengths, the wire is molded into tire treads for added traction, better heat and static dissipation and longer life, for such applications as aircraft tires and other critical tire applications. The testing and manufacture of brass-plated, high-tensile wire with proper adhesion and strength was a National-Standard engineering contribution to the rubber industry. It is typical of the many National-Standard wire-in-rubber problem solutions. Call National-Standard for help in solving your wire-in-rubber problems.



NATIONAL-STANDARD COMPANY
Niles, Michigan

news about people

Benjamin J. Skowronski becomes manager, Midwest sales, for National Polychemicals, Inc., Wilmington, Mass. He will make his headquarters in Akron, O. Previously he was technical service representative for Neville Chemical Co.

E. C. Slaght, Jr. is now technical director and assistant to the president, Newport Industries Co., division of Heyden Newport Chemical Corp., Pensacola, Fla. He will organize and coordinate the company's expansion and new product programs. In 1956, Slaght became manager of Heyden Newport's market development department in New York, N. Y.

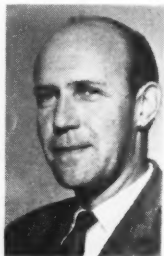
Richard Gallmeyer and **William A. Taylor** have been named representatives for products of Parker Seal Co., Culver City, Calif. Gallmeyer will cover southern Ohio, southern Indiana, and Kentucky areas from Indianapolis, Ind.; while Taylor handles Pittsburgh, Pa. and surrounding area.

John J. Paredes has been advanced to Midwest regional sales manager, Geigy Industrial Chemicals, Yonkers, N. Y., and will make his headquarters at Chicago, Ill. He formerly was field sales representative at St. Louis, Mo. **Richard J. Micheline** has joined the sales force at Chicago. He previously was a field representative for The Virginia Smelting Co.

William St. John has been appointed silicone rubber products sales manager for Pawling Rubber Corp., Pawling, N. Y., and will be responsible for directing expanding services and operations in the silicone rubber product field. He was formerly with the rubber division of Hewitt-Robins, Inc., as sales manager for silicone products.



W. St. John



N. A. Klemp



J. E. Purdy Co., Inc.



Falcon Studios

B. J. Skowronski **R. A. Hagberg**

Ralph A. Hagberg has joined The Capital City Products Co., Columbus, O., as sales manager of the fatty acid division. He has been connected with the chemical industry for more than 20 years in various capacities.

Robert G. Belknap is now staff representative for the rubber and textile sections, National Safety Council, Chicago, Ill. He will act as liaison man between the council staff and officers of the rubber and textile sections and will also be technical advisor to member firms in the rubber and textile industries.

Ronald Sundberg has been made sales representative for the chemical division, General Mills, Kankakee, Ill. He will be responsible for sales in Indiana and Michigan of the company's Versamid polyamide resins, GenEpoxy epoxy resins, Genamid liquid coreactants, fatty nitrogen chemicals, and other organic chemical specialty products.

Meir Weinstein has joined the molded products development section of The Richardson Co., Melrose Park, Ill. Previously he was employed by Serafon Resinous Chemicals Corp., Ltd., Rehovot, Israel.

Norman A. Klemp has joined Pacific Moulded Products Co., Los Angeles, Calif., as plant manager. **Robert S. Lundgren** became chief engineer. Klemp was formerly assistant to the president, Sheller Mfg. Corp., Detroit, Mich. Lundgren was manager of engineering and development of the mechanical goods division, General Tire & Rubber Co., Wabash, Ind. His other experience includes engineering duties with H. O. Canfield Co. and United States Rubber Co.

Clay Sheets has been named sales service engineer, Marine Magnesium Division, Merck & Co., Rahway, N. J., to assist **William H. Crom**, recently appointed sales manager. Sheets was formerly plant engineer and purchasing agent of the plant in South San Francisco, Calif.

John P. B. Jones has been appointed sales representative for The Pigment & Chemical Co., Ltd., Montreal, P.Q., Canada, and will serve industries in the area of British Columbia and Alberta from his headquarters at Vancouver, B. C.

Lloyd C. Adam becomes manager of the rubber and plastics machinery division, Taccone Corp., North East, Pa. Previously he was sales manager and executive vice president of Erie Engine & Mfg. Co.

Robert E. Ward has been appointed plant manager of The Carwin Co.'s North Haven, Conn., plant, which produces specialty isocyanates, high-temperature polyurethane foam systems, and organic chemicals.

David Kahn has been appointed national sales manager, Marathon Rubber Products Co., Wausau, Wis. He has had a background in sales promotion and sales management with two other firms. **Irving Bell** is now research and development coordinator for Marathon.

Joseph Gilbert has been named secretary and general manager, Society of Automotive Engineers, Inc., New York, N. Y. He succeeds **John A. C. Warner**, who will continue to serve as an advisory consultant. Gilbert, who joined the organization 14 years ago, recently served as assistant general manager.



D. Kahn



J. Gilbert



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The annual subscription is nominal and brings to members the bi-monthly **TRANSACTIONS** and **PROCEEDINGS**, which contain many original papers and important articles of value to rubber scientists, technologists, and engineers.

Members have the privilege of purchasing at reduced rates other publications of the Institution, including the **ANNUAL REPORT ON THE PROGRESS OF RUBBER TECHNOLOGY** (which presents a convenient review of advances in rubber), and a series of **MONOGRAPHS** on special aspects of rubber technology (monographs published to date deal with Tire Design, Aging, Calendering, and Reinforcement).

*Further details are easily obtained
by writing to:*

SECRETARY
INSTITUTION OF THE RUBBER INDUSTRY
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Telephone: Bayswater 9101



WIRE-IN-RUBBER

... problem solved

The polyethylene bead wire package shown above is another new development from National-Standard that permits more extended storage of bead wire without danger of rust or corrosion.

Extensive testing of the new package over many months in highly humid environmental chambers, without any evidence of wire corrosion, proved the new package superiority over old-style wrappers . . . means tire manufacturers can store bead wire for months without fear of damage.

The solution to this special wire-in-rubber problem is another National-Standard contribution to the rubber industry. Call National-Standard for help in solving your wire-in-rubber problems.



NATIONAL-STANDARD COMPANY
Niles, Michigan

Anthony J. DiMaggio is now factory manager of the new tire plant which The Firestone Tire & Rubber Co., Akron, O., is building in Bethune, France. He leaves the post of production manager at the Pottstown, Pa., tire plant. Construction of the Bethune plant is expected to be completed late this year.

Donald I. Kyle succeeds **Elmer R. Gibson** as manager of the purchasing department, Sciberling Rubber Co., Akron, O. Kyle has been assistant manager of purchasing. Gibson will continue to serve in an advisory capacity.

William E. Price has been promoted from equipment sales manager to advertising manager of the Liquid Carbonic Division, General Dynamics Corp., Chicago, Ill. He will be responsible for directing the division's advertising, public relations, and sales promotion throughout the nation.

Marcy W. Osborne, Jr. has been named general manager of B. F. Goodrich-C.S.R. Chemicals Pty. Ltd., a chemical firm recently established in Australia by B. F. Goodrich Chemical Co., Cleveland, O., and C.S.R. Chemicals Pty. Ltd., of Sydney, Australia.

L. E. Greensingh is now staff engineer, chemical division, The General Tire & Rubber Co., Akron, O. **Richard S. Novitsky** succeeds him as technical superintendent of the Mogadore, O., chemical plant.

Robert J. Belner has been appointed technical manager of new products, The General Tire & Rubber Co., Akron, O., and will be responsible for the search, evaluation, and initial technical follow-up for new products. Until recently he was engaged in synthetic rubber research at Case Institute of Technology. **William J. Hanlon** is technical manager of standard products. He will direct the technical facilities of the chemical division manufacturing plants and their pilot facilities. Hanlon was formerly technical superintendent of the company's Ash-tabula, O., chemical plant.



A. J. DiMaggio T. W. Dwight, Jr.

Theodore W. Dwight, Jr., manager of central sales, will head the new sales service office at Cleveland, O., for Crawford & Russell, Inc., Stamford, Conn. Dwight was formerly project manager for a polymer plant designed and engineered by the company for The Borden Chemical Co. Crawford & Russell engages in the design, engineering, and construction of complex polymer, synthetic rubber, and organic chemical plants.

James V. Daniels is now a salesman for the eastern region, Jefferson Chemical Co., Inc., Houston, Tex. Previously he was with Shell Oil Co.

John D. Heide has been advanced to senior research scientist at the United States Rubber Co. research center, Wayne, N. J. A member of the mechanical engineering research department, he specializes in applying automation to manufacturing processes.

Henry J. Jackelen is now managing director of the Sao Paulo, Brazil, plant, Firestone International Co., a division of The Firestone Tire & Rubber Co. Jackelen, who has been comptroller of the Brazilian subsidiary, succeeds **George E. Porteck**, who has retired.

E. H. Baker has been named general manager, Columbian Continental Europa, S.p.A., a company owned jointly by Columbian Carbon Co., New York, N. Y., and Continental Carbon Co., Houston, Tex., which is constructing production facilities at Trecate, near Milan, Italy.

George R. Lawson has been elected vice president, general manager, and a director of Pennsalt Chemicals of Canada, Ltd., Oakville, Ont., Canada. Lawson, whose headquarters are in Philadelphia, Pa., is also general manager of the chemical specialties division, Pennsalt Chemicals Corp., Philadelphia, which sells a similar line of products in the United States.

Archibald T. McPherson, associate director, National Bureau of Standards, received the honor scroll from the Washington, D. C., chapter of The American Institute of Chemists. Dr. McPherson was selected in recognition of his encouragement of young scientists and his leadership in the calibration and specification activities engaged in by the National Bureau of Standards.

William R. Blake is now managing director of Industria Colombiana de Llantas, S.A., Bogota, Colombia, a subsidiary of The B. F. Goodrich Co. Blake was manager of International B. F. Goodrich operations in Puerto Rico since 1956.

Vernon A. Langille is now Midwest public relations manager for The Firestone Tire & Rubber Co., Akron, O. He will operate from the new Midwest public relations office in Chicago, Ill., at 26 E. 16th St. Langille has been a member of the Firestone company's public relations staff for the past four years.

Clarence R. Flynn is now general foreman, technical, at the Henry Ill., general chemicals plant, B. F. Goodrich Chemical Co., Cleveland, O. The former head of the technical department, Flynn will now take over responsibility for the plant's production department.

William J. Boyd is the new factory manager of the Akron, O., plant, Xylos Rubber Co., a division of The Firestone Tire & Rubber Co. **John L. Dum** will fill Boyd's shoes as chief chemist. Dum was technical manager of the fuel cell division, Los Angeles, Calif.



R. J. Belner

W. J. Hanlon

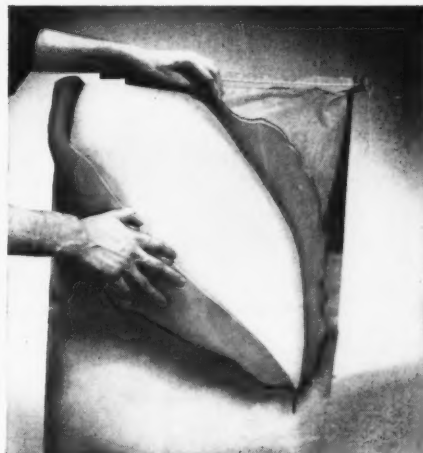
H. J. Jackelen

E. H. Baker

W. J. Boyd

J. L. Dum

Release With Real Ease



products, you stand to save by specifying Syl-off coatings. You slash unloading time, shorten production time . . . and you throw away only the package — not a bit of the packaged product you've paid for.

In addition, you'll find Syl-off coatings have excellent water and moisture resistance; won't migrate, transfer or contaminate. They often last as long as the paper itself, and their light weight frequently means lower costs when shipping coated paper.

Sticky Products Won't Stick To Paper with a Syl-off Coating!

Unloading sticky gums, stocks and compounds from shipping containers, storage wrappings and interleaving is no fun when it's a tug of war—it's a costly chore. Manufacturers lose production time and lose money on material left sticking to the wrapper . . . and operators lose their temper.

Now you can be rid of this profit-eating problem. The solution is Syl-off* paper coatings developed by Dow Corning. These new silicone coatings resist sticking better than any other specialty coatings . . . stubborn stickers, such as unvulcanized rubber, latices and pressure-sensitive adhesive masses come clean quickly and easily.

Job Proved. Here's an example that's typical of the effectiveness of these Dow Corning coatings. A well-known company offers camelback on cores coated with Syl-off. Of all core treatments tested, only Syl-off gave completely satisfactory release . . . even after prolonged storage. Retreaders can easily remove *all* the camelback . . . none is left sticking to the core. Syl-off coatings are used with similar success on interleaving, multiwall bag liners, drums, boxboard and many other types of packaging.

How can Syl-off help you? If you ship sticky materials, Syl-off coatings assure your customers of stick-free, waste-free releases . . . provide an important sales advantage. If you receive, handle and process sticky



For more information about Syl-off paper coatings and a complete list of approved sources of paper and paperboard made with Syl-off coatings contact any Dow Corning branch office or write Dept. 7908.

* T. M. Dow Corning Corporation

Your nearest Dow Corning office is the number one source for information and technical service on silicones.



Dow Corning CORPORATION
MIDLAND, MICHIGAN

ATLANTA BOSTON CHICAGO CLEVELAND DALLAS LOS ANGELES NEW YORK WASHINGTON, D. C.

news about people

S. B. Beddow has been appointed technical sales representative for Buton resin by Enjay Chemical Co., a division of Humble Oil & Refining Co., New York, N. Y., and he will continue to make his headquarters at Akron. **O. D. G. Busch** replaces him as chemical technical sales representative in Akron. **T. S. Grant, Jr.**, has been assigned to Akron as a polymer representative.

J. E. (Buck) Hynds has been named manager of treading and repair materials sales for The Firestone Tire & Rubber Co., Akron, O., to succeed **J. W. Hodgson**, who retired after 33 years in the retread business. **R. A. Mitchell** becomes manager of tread rubber sales, and **J. A. Fuhro** manager of the retread sales department.

Bert S. Taylor, director of marketing and purchasing for the chemicals and plastics division, Food Machinery & Chemical Corp., New York, N. Y., has been named assistant director for mobilization planning, chemical and rubber division, Business & Defense Services Administration, United States Department of Commerce, Washington, D. C. This is part of an arrangement by which industry makes the services of key executives available for temporary assignment, without compensation from the government.

John R. Wheeler, Sr., has retired as vice president in charge of the standard machinery division, Franklin Research & Development Corp., Mystic, Conn. He will retain his position as vice president and a member of the board of directors of Franklin Research & Development Corp. **Philip C. Greene** succeeds him as division manager, Standard Machinery Division. **John McCormick** replaces Greene as sales manager of the Davis-Standard Division, sales organization for Standard Machinery. **John R. Wheeler, Jr.**, special sales engineer for wire insulating accounts, will handle the area formerly served by McCormick. In addition, **Dennis Deveau**, formerly sales office manager, is now sales product manager for wire and cable machinery; while **N. V. Fay** becomes sales product manager for plastics processing machinery.



J. V. Carlin, Jr.



D. E. O'Connell

James V. Carlin, Jr., has been named vice president of sales, Acme-Hamilton Mfg. Corp., Trenton, N. J. In his new position he will be responsible for sales of both the Acme Rubber and Hamilton Rubber divisions. He was formerly general sales manager for the Acme division.

Phillip Mackler has transferred to the West Coast as technical sales representative, chemical division, The General Tire & Rubber Co., Akron, O. From his Los Angeles, Calif., headquarters, he will cover the West Coast, Texas, and Colorado for the rubber and plastic industries.

Donald C. MacDonald has been named senior research scientist at the research center, United States Rubber Co., Wayne, N. J. A member of the mechanical engineering research department, Dr. MacDonald is primarily engaged in the development of instruments used to measure physical properties of rubber and plastics.

Charles G. Wyman is now technical assistant to the president, Lee Rubber & Tire Corp., Conshohocken, Pa. Before joining the company he was production manager for Dayton Rubber Co.

Carl A. Fuller is the new assistant director of purchases, Dayco Corp. (formerly The Dayton Rubber Co.), Dayton, O. Formerly senior buyer for maintenance equipment and supplies, he succeeds **C. A. Griep**, who has retired after more than 28 years with the company.

Donald E. O'Connell has been appointed technical sales representative, Marbon Chemical, division of Borg-Warner, Washington, W. Va. He will cover Ohio, Indiana, Michigan, and western Pennsylvania for products lines which include Marbon's paint resins, rubber resins, Marmix latices, and Ty-Ply adhesives.

J. V. Waggoner has been promoted to director of sales, raw materials, for Monsanto Chemical Co.'s plastics division at Springfield, Mass. Prior to this appointment he was sales manager, raw materials.

James M. Foggo has been appointed manager, market research, B. F. Goodrich Canada, Ltd., and will make his headquarters at Kitchener, Ont. He has had experience in the rubber, petroleum, and consumer fields of Canadian industry.

Parker S. Anderson becomes development engineer at the Vulcan plant, Reeves Brothers, Inc., at Buena Vista, Va. He will be responsible for the development and engineering of the Reeves-Vulcan synthetic rubber-coated diaphragm line for gas meters, regulators, and all types of controls.

A. W. Hopton, vice president and a director of Dominion Rubber Co., Ltd., Montreal, P.Q., Canada, and former general manager of the tire division at Kitchener, Ont., has been named vice president, automotive sales, in which capacity he will be responsible for tire and other automobile products. **M. H. Hudspeth**, formerly assistant general manager, tire division, is now general manager.

Paul E. Ditto has been named technical service manager, B. F. Goodrich-C.S.R. Chemicals Pty. Ltd., a chemical company recently established in Australia by B. F. Goodrich Chemical Co., Cleveland, O., and C.S.R. Chemicals Pty. Ltd., Sydney, Australia. From his headquarters at Melbourne, Australia, Ditto will be responsible for initiating and directing the new company's sales and customer service activities.



J. R. Wheeler, Sr.



P. C. Greene



J. R. Wheeler, Jr.



J. McCormick



N. V. Fay



D. Deveau

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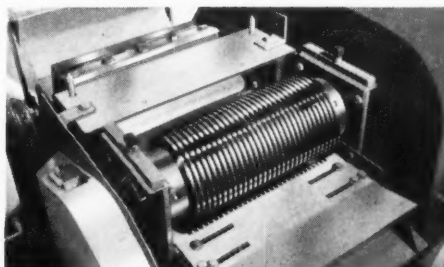
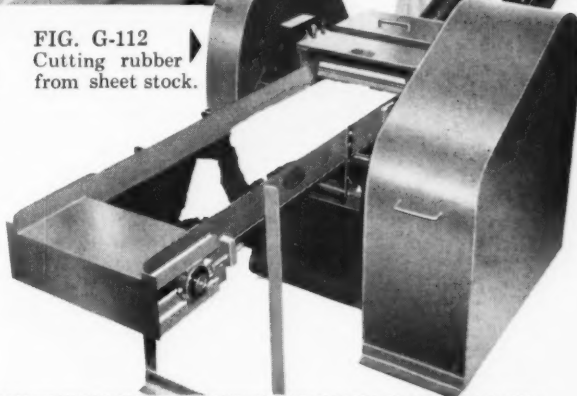


FIG. G-100
GIANT 200
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from 18 to 42
inches.
Crosscut $\frac{1}{4}$ "
to 10" or 12".



FIG. G-112
Cutting rubber
from sheet stock.



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market reviews

Natural Rubber

The market for natural rubber continued firm through the first half of the June 16-July 15 period, but the continued absence of buying by both Russia and China and the slack in demand from other quarters, coupled with the disappearance of the last chance of any technical squeeze developing in the RSS #1 July position, resulted in heavy liquidation on the Singapore market.

This liquidation in Singapore and the local market sent rubber futures plummeting in the first week of July. Prices steadied at the new level in the second week, showing some resistance to further weakening.

The fall in futures was paralleled by a decline in spot prices, attributed to a greater volume of available spot rubber and to the approach of factory shutdowns for vacations.

The market was still digesting the June 23 announcement of the General Services Administration that it would sell bareback ribbed smoked sheets at market price less an allowance of 3¢ per pound to compensate for age, extra handling, and other deterioration factors. The move was designed to make the sale of crude natural rubber from government stockpiles competitive with freshly produced and imported crude.

Total natural rubber consumption in May, according to The Rubber Manufacturers' Association, Inc., was 41,410 long tons, compared with 42,032 in the preceding month and 38,777 tons in May of last year. Five-month consumption at 233,023 tons was down slightly from 229,509 in the same period last year. Stocks of natural at the end of May were 82,470 tons, down from 83,451 tons at the end of April, and slightly below the 82,983 tons a year ago.

A report issued by the International Rubber Study Group showed world production of natural rubber at 152,-

500 tons and consumption 160,000 tons during April, compared with 157,500 tons produced and 162,500 tons consumed during March. The difference was made up by deliveries from government stockpiles.

For the first four months of the year 630,000 tons of natural and 647,500 tons of synthetics were produced, and 675,000 tons of natural and 582,500 tons of synthetics consumed, the report showed. These figures compared with 620,000 tons of natural and 502,500 tons of synthetics produced worldwide during the first four months of 1959, and 692,500 and 505,000 tons consumed.

Market analysts abroad predicted that the decline in the ratio of consumption of natural to synthetic rubbers, particularly in the United States, will continue in the near future, until the prices of natural rubber settle on a much lower level and become more competitive with those of synthetic.

Nevertheless, the chairman of the London Asiatic Rubber & Produce Co., Ltd., said at the company's annual meeting that at present, and possibly for some time in the future, natural rubber will be found to be in short supply.

"The market has been saved from acute shortage of supplies only by substantial stockpile releases," he said in explanation.

June sales on the New York Commodity Exchange amounted to 12,710 long tons, down from May sales of 14,160 long tons. There were 22 trading days in June and 21 in the June 16-July 15 period.

On the physical market, according to the Rubber Trade Association of New York, RSS #1 averaged 45.63¢ a pound for June and 42.65 for the June 16-July 15 period. Average June sellers' prices for the representative grades were RSS #3, 44.48¢, Amber Blankets, 40.16¢, and Flat Bark, 34.07¢.

Synthetic Rubber

Consumption of new rubber in the United States for June totaled 138,370 long tons, compared with the 133,256 long tons consumed during May, according to the monthly report of The Rubber Manufacturers Association, Inc.

Synthetic rubber production was 122,549 long tons for June, against 126,549 long tons for May and 106,716 long tons for June, 1959. For the first six months of 1960 total synthetic rubber production was 759,257 long tons, contrasted with 647,322 long tons for the first half of last year.

Consumption of all types of synthetic rubber rose to 95,775 long tons in June from 91,993 long tons in May. Synthetic rubber accounted for 69.22% of total new rubber consumption. This use was a new high for the third straight month. In May the ratio was 69.03% and in April, 68.23%. For the first six months of the year the ratio was 68%, compared with 65.77% for the first half of 1959.

Consumption (in long tons) by type in June increased for all types except IIR (butyl), as follows: SBR, 81,130, against 77,423; CR (neoprene), 6,905, against 6,471; IIR, 5,200, against 5,602; and NBR (nitrile), 2,540, against 2,497. For the first six months of this year, compared with the similar period of last year, the figures were: SBR, 471,357, against 427,054; CR, 42,324, against 43,625; IIR, 34,781, against 30,983 and NBR, 15,621, against 17,167.

Total synthetic rubber exports for June were 32,325 long tons, compared with 30,806 long tons for May. For the first six months of the year exports totaled 192,858 long tons, compared with 135,764 long tons during the corresponding period last year.

Total synthetic stocks in June were 222,451 long tons, against 227,332 long tons in April.

Masterbatch production showed a mixed trend after having risen in May.

REX CONTRACT

	June 17	June 24	July 1	July 8	July 15
1960					
July	45.40	45.80	44.90	42.85	42.40
Sept.	41.95	41.30	40.40	38.15	37.85
Nov.	40.60	40.10	39.20	37.25	36.90
1961					
Jan.	39.50	39.15	38.40	36.55	36.40
Mar.	38.70	38.75	38.05	36.25	36.20
May	28.40	38.30	37.70	35.95	35.70
July	38.10	37.85	37.35	35.65	35.30

NEW YORK OUTSIDE MARKET

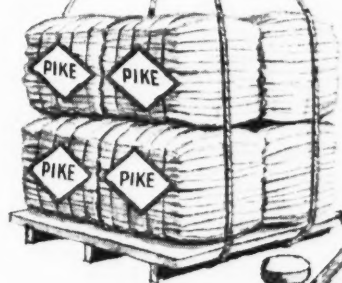
	June 17	June 24	July 1	July 8	July 15
RSS #1	46.50	47.00	43.50	42.25	41.50
#2	46.00	46.50	43.25	41.75	41.13
#3	45.25	45.50	42.75	41.25	40.50
Pale Crepe					
#1 Thick	48.50	49.00	48.00	46.75	46.00
Thin	48.50	49.00	48.00	46.75	46.00
#3 Amber Blankets	40.00	40.00	38.75	37.75	35.50
Thin Brown Crepe	39.75	39.75	38.75	37.75	35.50
Standard Flat Bark	33.75	33.50	31.50	30.50	29.00

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market reviews

Black masterbatch 3,404 long tons contrasted with 4,071 long tons in May. Oil black masterbatch was up to 24,180 long tons from 23,023 long tons in May. Oil masterbatch was 36,616 long tons, compared with 36,895 long tons produced in May.

Latex

The liquid latex market was very quiet during the first three weeks of the June 16-July 15 period owing to lack of buying interest. The continuing high prices for natural latex were discouraging buyers, who were switching to the use of the synthetic latices as much as possible. This is true although natural latex is considered by many as the better raw material both from a processing and a finished product point of view.

During the last week of the period, however, the value of drum latex was marked down in sympathy with dry rubber prices and encouraged a better buying interest. Fair quantities for current shipment were reported taken off the market, diminishing the selling pressure for the time being. Only a limited volume of business is reported for forward shipment. The bulk latex market is very quiet.

Over a longer period the switch to synthetic latices may continue. The great switch from natural to synthetic is in the United States, where consumption of natural liquid latex for the first four months of 1960 dropped 25%, according to the Natural Rubber Bureau; while consumption of synthetics increased 35%. Only 29.9% of the U. S. liquid latex consumption in May was in natural latex. The United States is expected to use only about 50,000 tons of natural latex this year, compared with 71,745 tons in 1959, the Natural Rubber Bureau reports.

Indications are that most other countries are likely to reduce their requirements of natural latex this year unless prices drop further. It is understood that because of dwindling demand for natural latex and consequent storage problems, some of the larger producers in Malaya are switching part of their production to sheet.

Shipments from Malaya during May totaled 8,749 tons, the lowest monthly total since September, 1958, compared with 10,463 tons in April, 1960. The breakdown includes 2,708 tons shipped to the United Kingdom, 1,582 tons to the United States, and 913 tons to Japan, compared with 2,835, 1,758, and 1,205 tons, respectively, that were shipped in April.

Prices for ASTM centrifuged concentrated natural latex, in tank-car quantities, f.o.b. rail tank car, ran about 43.02¢ per pound solids. Synthetic latices prices were 26 to 40.24¢ for SBR; 37 to 57¢ for neoprene, and 45 to 60¢ per pound for NBR.

(All figures in long tons, dry weight)

Type of Latex	Production	Imports	Consumption	Month End Stocks
Natural				
Apr.	0	4,935	4,199	13,896
May	0	*	3,655	15,214
SBR				
Apr.	9,408	—	7,154	9,018
May	8,162	—	6,821	10,031
Neoprene				
Apr.	1,137	0	913	1,595
May	1,250	0	868	1,745
Nitrile				
Apr.	917	0	976	2,242
May	1,009	0	978	2,342

*Not available yet for period covered.

Scrap Rubber

Trading conditions in the scrap rubber market slackened off considerably during the June 16-July 15 period, reflecting the approach of vacation periods for reclaimers and other producers. Several reclaimers shut down in late June or the first week in July, and the others were scheduled to follow.

Prices of mixed auto tires held level through the period, with prices at eastern points ranging from \$7 to \$12, the high side applicable only on shipments to Buffalo. At Akron mixed auto tires were quoted at \$11.50.

Prices of mixed auto tubes held steady at 5.75¢ in the East and in Akron, and black passenger tubes held steady at 5.75¢ in the East, but dropped from 5.75¢ to 5.50¢ in Akron at the midpoint of the June 16-July 15 period. Synthetic butyl tubes dipped from 8¢ to 7.75¢ at the beginning of July both at eastern and midwestern points.

	Eastern Points	Per Net Ton	Akron O.
Mixed auto tires	\$7.00/\$12.00		\$11.50
S.A.G. truck tire	nom.		nom.
Peeling, No. 1	nom.		\$33.00
2	nom.		nom.
3	nom.		nom.
	(¢ per Lb.)		
Auto tubes, mixed	5.75		5.75
Black	5.75		5.50
Red	nom.		nom.
Butyl	7.75		7.75

Reclaimed Rubber

Reclaimed rubber business picked up during the June 16-July 15 period, showing a sizable gain over business for the previous period.

The pickup was due primarily to export sales, an eastern reclaiming company reported. The manufacturer said that the foreign markets are having a strong period and with the shortage of reclaim scrap are of necessity importing large quantities of reclaim. No foreign exports of reclaim were made to the United States during May, and

none are expected, at least through the summer, the reclaimer predicted.

An eastern reclaimer reported that the market was maintained at a high level during the June 16-July 15 period by orders from many rubber manufacturers engaged in building inventories. Because of factory vacation shutdowns, however, shipments for the first two weeks of July ran 10% behind shipments for the last half of June.

According to The Rubber Manufacturers Association, Inc., reclaimed rubber consumption for June was 24,895 long tons, against 23,763 long tons in May. For the first half of the year, consumption was 151,977 long tons, contrasted with 145,281 long tons during the same period last year.

Production figures for June were 25,300 long tons compared with 25,676 long tons for May. For the first six months of 1960, production was 159,692 long tons, contrasted with 147,970 long tons for the first half of the preceding year.

As in May, no reclaim was imported in June. Exports for June were 1,225 long tons, compared with 1,167 long tons for May. For the first six months of the year exports totaled 7,546 long tons, compared with 6,832 long tons for the first half of last year.

U. S. Rubber Reclaiming Co., Buffalo, N. Y., announced that it had made its first shipment to Venezuela via the St. Lawrence Seaway, sending 55,000 pounds of reclaimed rubber to General Tire & Rubber Co. plants in Caracas and Valencia aboard the German flag ship Lucie Schulte. The company said orders for Great Britain, Argentina, Brazil, Mexico, Israel and Spain will also be shipped through the St. Lawrence Seaway.

RECLAIMED RUBBER PRICES

Whole tire, first line	\$0.115
Third line	.1075
Inner tube, black	.17
Red	.22
Butyl	.17
Light carcass	.22
Mechanical, light-colored, medium gravity	.185
Black, medium gravity	.10

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims, in each general group separately featuring characteristic properties of quality, workability, and specific gravity, at special prices.

Industrial Fabrics

Prices of industrial grey cotton goods remained more or less stable during the June 16-July 15 period, and the market exhibited a satisfactory tone considering that part of the period included the holiday close-down of textile mills.

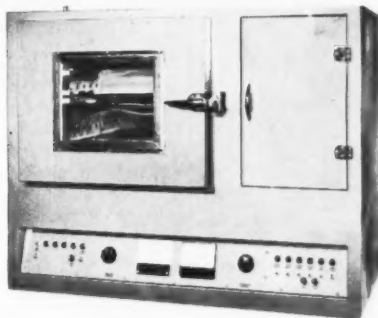
Quantity buyers found that they could not duplicate price quotations of mid-May, and in some cases buyers of

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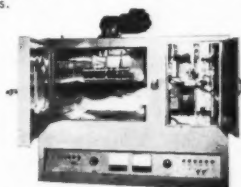
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market reviews

special constructions found mills asking more in mid-July than they had in mid-June.

While there had been a good deal of experimentation during previous quiet periods, the trend has been back to standard goods, drills, broken twills, sateens, osnaburgs, sheetings, and related fabrics. The widths are also back to the standard 59 to 61 inches, and 52 to 58 inches, with the customary yarn counts.

The differential between A and B grade cloths, which was 4¢, has narrowed to 2¢, and the result has been a shift back to the better qualities.

Sales were mainly for yardage to be shipped in during July and August, which caused hopes of a broad market during the last half of July.

Drills were down half a cent from a month ago, and sateens down about a cent and a half. Broken twills were up 5-6¢.

Industrial Fabrics

Drills*

59-inch, 1.85, 68x40	yd.	\$0.395
2.25, 68x40		.335

Broken Twills*

54-inch, 1.14, 72x52	yd.	.585
58-inch, 1.06, 72x52		.63

Osnaburgs*

59-inch, 2.35, 32x26		.295
61-inch, 2.20, 38x28		.305
62-inch, 2.23, 32x26		.30

Ducks

Numbered Duck†

List less 45%

Enameling Ducks*

	S.F.	D.F.
38-inch, 2.00 yd.	\$0.275	.33
51.5-inch, 1.35 yd.	.4738	.4888
57-inch, 1.22 yd.	.4838	.50
72-inch, 1.05 yd.	.6575	.6765

Hose and Belting Ducks*

Basis	lb.	.67
-------	-----	-----

Sheeting*

52-inch, 3.85, 48x48	yd.	.24
57-inch, 3.47, 48x48		.245
60-inch, 2.10, 64x64		.38
2.40, 56x56		.34

Sateens*

53-inch, 1.12, 96x60	yd.	.6275
1.32, 96x64		.56
58-inch, 1.02, 96x60		.68
1.21, 96x64		.61

Chafers Fabrics*

14.40-oz./sq.yd. P.L.	lb	.74
11.65-oz./sq.yd. S.Y.		.65
10.80-oz./sq.yd. S.Y.		.68
8.9-oz./sq.yd. S.Y.		.70

* Net 10 days.

† 2% 10 days.

Rayon and Nylon

Use of nylon tire yarn in the original-equipment passenger-tire field will increase sharply in the next two years, Edward A. O'Neal, Jr., president of

nylon tire yarn producing Chemstrand Corp., predicted.

This view is not shared by spokesmen for producers of Tyrex, a rayon yarn used in tires of 98% of all 1959 and 1960 cars. Tyrex spokesmen predicted virtually all 1961 cars would use Tyrex yarn.

The question of whether nylon cord tires will invade the original-equipment field for 1961 is still undecided. Since last summer nylon yarn producers have cut prices twice, apparently in an attempt to win over car makers, but Tyrex makers matched both price reductions. O'Neal said Chemstrand thinks the trend to lower nylon tire yarn prices since 1955 "will probably continue, but at a less sharp rate."

Total packaged production of rayon and acetate filament yarn during June was 56.2 million pounds, including 23.6 million pounds of high-tenacity yarn and 32.6 million pounds of regular-tenacity yarn.

The May totals were 59 million pounds, including 24.7 million pounds of high-tenacity yarn and 34.3 million pounds of regular-tenacity.

For the first six months of 1960, total production of rayon and acetate filament was 351 million pounds, including 151.9 million pounds of high-tenacity yarn and 199.1 million pounds of regular-tenacity.

Filament stocks at the end of June were 58.5 million pounds, including 19.6 million pounds of high-tenacity rayon yarn and 38.9 million pounds of regular-tenacity yarn.

Stocks at the end of May totaled 64.4 million pounds, including 19.5 million pounds of high-tenacity rayon yarn, and 44.9 million pounds of regular-tenacity yarn.

Shipments of filament totaled 59.6 million pounds in June, including 21.5 million pounds of high-tenacity yarn and 38.1 million pounds of regular-tenacity.

In May the total was 56.3 million pounds, 22.3 million pounds of high-tenacity yarn and 34 million pounds of regular-tenacity.

The five-month total for filament was 339.4 million pounds, including 141.7 million pounds of high-tenacity yarn and 197.7 million pounds of regular-tenacity yarn.

RAYON PRICES

Tire Fabrics

1100/490/2	\$0.69
1650/908/2	\$0.58/.615

Tire Yarns

High-Tenacity	
1100/ 490	.56
1100/ 980	.57
1150/ 490, 980	.56
1230/ 490	.56
1650/ 980	.49
1875/ 980	.49/.50
2200/ 980	.48

Super-High Tenacity	
1650/ 720	.50/.59

NYLON PRICES

Tire Yarns

840/140	.94/.97
1680/280	.91/.94

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A PROGRESSIVE RUBBER FABRICATOR IN CONNECTICUT has an opening for a mold line foreman experienced in all phases of rubber molding. Salary commensurate with experience. Also an excellent opportunity for further advancement. Address Box No. 2489, care of RUBBER WORLD.

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Outstanding chemical sales organization serving the rubber industry offers excellent opportunity for graduate chemist or chemical engineer having 5 to 7 years' diversified experience in rubber compounding and processing. Applications held in strict confidence. Send résumé to Phillips Chemical Company, 318 Water Street, Akron 8, Ohio.

WANTED

Assistant Research & Development Director
Medium-size rubber products manufacturer located in New England. Experience in rubber technology and product development. Ph.D. preferred. Salary open. Address Box No. 2493, care of RUBBER WORLD.

ESTABLISHED MANUFACTURERS' REPRESENTATIVES

One each for Indiana, Southern Illinois, and Wisconsin to represent molder of custom rubber parts. Located in Chicago, 13 years young, aggressive. Specialize in intricate, accurate parts, natural and synthetic, colored and black. Exclusive territory—good commissions. Address Box No. 2485, care of RUBBER WORLD.

SITUATIONS OPEN (CONTINUED)

"Rubber Adhesives & Sealers Sales Head and Salesmen wanted. Give Résumé and References. Ground Floor Opportunity.

CONTINENTAL TAPES • CAYCE, S. C.

EXTRUSION CHEMIST WANTED

We have an opening in our organization for a rubber chemist to serve as assistant to chief chemist. Minimum of three years' experience in compounding of extruded products desired. Also, would prefer man to have had experience in automotive extruded compounding. Salary up to \$7,200.00, depending on qualifications. Opportunity for growth with expanding company. Send résumé. THE SPERRY RUBBER & PLASTICS CO., BROOKVILLE, INDIANA.

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SUPERINTENDENT with fifteen years' experience in the rubber industry. Seven years hard rubber; eight years foam rubber. Supervised production and quality control for eight years. Responsible for compounding, molding, finishing of all products. Banbury-Mill-extruder experience. Seeks responsible challenging position.

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RUBBER TECHNICIAN, 9 YEARS' SOLID EXPERIENCE IN ALL phases of passenger and H. D. tire production including compounding, MRC testing, Banbury mixing, tubing and calendaring, tire construction, curing and final inspection, expert trouble shooter; desire responsible position. Production management or technical service in Los Angeles or vicinity. Address Box 2495, care of RUBBER WORLD.

PLANT MANAGER, MUST RELOCATE. 22 YEARS' SOLID background in all phases of administration and manufacturing. Diversified and wide product lines. Successful proven record as administrator and in labor relations. Wish to associate with progressive and growing company. Address Box No. 2486, care of RUBBER WORLD.

RUBBER TECHNOLOGIST, OVER FIFTEEN YEARS' DIVERSIFIED background in mechanical rubber goods, seeks responsible position in development or production. Experience includes compounding, manufacturing, management, development, cost estimation, raw materials, etc. Address Box No. 2487, care of RUBBER WORLD.

TECHNICAL SERVICE AND/OR SALES POSITION DESIRED. Experience includes compounding, development production, technical service and sales background. Address Box No. 2497, care of RUBBER WORLD.

Experienced
RUBBER COMPOUNDER
for
EUROPEAN
TECHNICAL SERVICE
with
Major Supplier to the Rubber Industry

LOCATION, PARIS:

To call on the rubber industry throughout Europe.

RESIDENCE TERM:

5 years minimum

Special consideration given to applicants who have lived in Europe. Proficiency in languages desirable. Well qualified person will have the opportunity to become Resident European Technical Service Manager.

Apply Box #2484, c/o RUBBER WORLD
in confidence

statistics of the rubber industry

U.S.A. Imports and Production of Natural and Synthetic Latexes

(Long Tons, Dry Weight)

Year	Natural	SBR	Neoprene	N-Type	Total Synthetic	Total Natural & Synthetic
1959	79,207	93,303	13,127	14,034	120,464	199,671
Aug.	7,131	8,225	1,242	1,258	10,725	17,856
Sept.	6,947	8,201	956	1,364	10,521	17,468
Oct.	6,747	9,424	1,020	1,187	11,631	18,378
Nov.	5,055	8,144	1,206	1,104	10,454	15,509
Dec.	6,705	8,429	1,017	1,045	10,491	17,196
1960						
Jan.	5,339	9,720	1,154	1,131	12,005	17,344
Feb.	5,812	9,862	1,085	1,098	12,045	17,857
Mar.	5,127	9,351	1,004	1,217	11,572	16,699
Apr.	4,935	9,408	1,137	917	11,462	16,397
May*	.....	8,162	1,250	1,009	10,421	.....

* Preliminary.

Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U.S.A. Consumption of Natural (Including Latex) and Synthetic Rubber (Long Tons)

Year	Natural	SBR Types	Butyl	Neoprene	N-Type	Total Natural and Synthetic
1959	555,044	886,275	65,454	84,955	34,638	1,626,366
Aug.	46,914	75,340	5,533	7,117	3,047	137,951
Sept.	49,252	79,835	6,579	7,326	3,119	146,111
Oct.	49,049	81,963	5,965	7,538	3,128	147,643
Nov.	42,039	69,217	5,327	6,684	2,655	125,922
Dec.	42,950	73,871	5,489	6,996	2,696	132,002
1960						
Jan.	46,354	78,891	6,093	7,361	2,788	141,487
Feb.	46,022	76,999	6,070	7,369	2,765	139,225
Mar.	47,205	81,065	6,324	7,693	2,645	144,932
Apr.	42,032	75,849	5,492	6,525	2,386	132,284
May*	41,263	77,423	5,602	6,471	2,497	133,256

* Preliminary.

Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U.S.A. Stocks of Latex

(Long Tons, Dry Weight)

Year	Natural	SBR	Neoprene	N-Type	Total Synthetic	Total Natural & Synthetic
1959	12,377	8,226	1,581	2,883	12,690	25,607
Aug.	11,472	6,775	1,576	2,779	11,130	22,602
Sept.	11,742	7,196	1,498	2,810	11,504	23,246
Oct.	12,220	7,570	1,464	2,888	11,922	24,142
Nov.	11,707	8,279	1,451	2,975	12,705	24,412
Dec.	12,377	8,226	1,581	2,883	12,690	25,067
1960						
Jan.	12,781	7,781	1,680	2,799	12,260	25,041
Feb.	12,974	8,606	1,534	2,535	12,675	25,649
Mar.	13,964	8,055	1,518	2,492	12,065	26,029
Apr.	13,896	9,081	1,595	2,242	12,918	26,814
May*	15,214	10,031	1,745	3,342	14,118	29,332

* Preliminary.

Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U.S.A. New Supply, Consumption, Exports, and Stock of Reclaimed Rubber

(Long Tons)

Year	New Supply	Consumption	Exports	Stocks
1959	303,345	286,410	12,812	27,738
Aug.	25,276	22,914	879	26,165
Sept.	28,123	25,137	937	27,384
Oct.	28,255	26,022	964	27,393
Nov.	22,525	20,217	909	28,526
Dec.	23,720	22,962	1,055	27,738
1960				
Jan.	26,442	26,540	1,106	29,031
Feb.	26,965	25,944	1,258	28,653
Mar.	29,100	26,625	1,542	29,719
Apr.	26,209	24,210	1,248	30,916
May*	25,676	23,763	.....	32,611

* Preliminary.

Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U.S.A. Exports of Synthetic Rubber

(Long Tons)

Year	SBR Types	Butyl	Neoprene	N-Type	Total
1959	220,336	21,700	39,551	8,256	289,843
Mar.	16,295	2,238	2,712	467	21,712
Apr.	19,154	2,135	3,741	527	25,557
May	12,281	2,587	2,942	642	18,452
June	21,871	2,386	2,522	937	27,716
July	19,814	1,580	4,105	440	25,939
Aug.	18,054	1,896	2,557	1,025	23,532
Sept.	22,506	2,240	4,864	692	30,302
Oct.	13,476	1,383	2,250	679	17,788
Nov.	18,916	1,242	3,362	648	24,168
Dec.	25,392	1,265	4,662	1,031	32,350
1960					
Jan.	21,967	2,396	4,185	527	29,075
Feb.	22,791	1,528	4,588	740	29,647
Mar.	27,081	1,803	4,874	532	34,290
Apr.	28,765	2,006	5,268	676	36,715

Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U.S.A. Stocks of Synthetic Rubber

(Long Tons)

Year	SBR Types	Butyl	Neoprene	N-Type	Total
1959					
Mar.	146,971	14,441	14,701	7,753	183,866
Apr.	147,867	12,496	14,848	7,728	182,939
May	156,209	12,710	15,024	7,820	191,763
June	145,486	11,128	14,986	7,969	179,569
July	142,606	9,899	15,187	8,912	176,604
Aug.	148,795	10,558	15,745	8,418	183,516
Sept.	147,400	9,535	12,845	8,526	178,306
Oct.	157,768	10,805	13,385	8,649	190,607
Nov.	168,490	11,447	13,043	9,077	202,057
Dec.	174,606	13,188	14,164	8,888	210,846
1960					
Jan.	183,242	14,039	15,143	9,198	221,622
Feb.	186,166	12,735	13,930	8,352	221,183
Mar.	189,308	12,764	13,491	8,175	223,738
Apr.	185,464	14,021	13,796	8,230	221,511
May*	188,808	16,014	14,243	8,267	227,332

* Preliminary.

Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

World Consumption of Natural Rubber

(1,000 Long Tons)

Year	United States	Eastern Europe and China	United Kingdom	Other Foreign	Total Foreign	Grand* Total
1959	555.0	445.2	180.6	924.2	1,550.0	2,105.0
Jan.	50.0	49.6	15.3	77.2	127.2	192.5
Feb.	47.3	29.8	13.8	77.7	117.5	167.5
Mar.	52.0	19.0	15.3	78.8	117.7	165.0
Apr.	41.5	37.8	13.9	80.2	131.0	172.5
May	38.8	41.2	13.8	76.2	131.2	170.0
June	47.8	42.1	18.3	82.4	134.7	182.5
July	47.5	32.7	13.0	74.3	112.0	172.5
Aug.	46.9	16.8	11.0	67.8	84.6	142.5
Sept.	49.3	41.1	18.1	81.5	122.6	190.0
Oct.	49.0	40.0	15.5	78.5	118.5	185.0
Nov.	42.0	49.4	15.6	78.0	127.4	185.0
Dec.	43.0	48.1	17.0	73.3	136.1	185.0
1960						
Jan.	46.4	45.4	14.7	76.0	136.1	182.5
Feb.	46.0	...	14.3	...	170.0	170.0
Mar.	47.2	...	17.3	...	...	157.5
Apr.	42.0	...	13.5	...	...	...

*Estimated.

Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce; and Secretariat of the International Rubber Study Group.

World Production of Natural Rubber

(1,000 Long Tons)

Year	Malaya		Indonesia		All Other	Total
	Estate	Native	Estate	Native		
1959	408.4	289.8	215.6	505.8	645.4	2,065.0
Jan.	37.6	27.2	20.4	22.3	67.5	175.0
Feb.	27.9	21.2	18.3	29.2	38.4	135.0
Mar.	28.5	21.1	17.7	39.4	48.3	155.0
Apr.	28.9	19.4	15.3	44.7	46.7	155.0
May	33.5	22.4	16.3	50.6	49.7	172.5
June	33.9	24.3	18.4	49.5	39.9	165.0
July	35.7	26.9	18.7	35.5	63.2	180.0
Aug.	36.5	24.9	17.9	43.5	54.7	177.5
Sept.	35.7	26.1	17.0	38.8	52.4	170.0
Oct.	36.0	25.5	18.0	53.0	68.5	192.5
Nov.	35.7	24.1	18.0	44.5	62.7	185.0
Dec.	38.6	26.7	19.5	54.7	63.0	202.5
1960						
Jan.	37.4	27.5	18.0	28.0	59.4	170.0
Feb.	32.1	22.6	17.4	32.9	45.2	150.0
Mar.	30.0	25.0	15.8	34.8	52.0	157.5
Apr.	28.1	18.8	...	...	...	...

Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce; Secretariat of the International Rubber Study Group.

World Consumption of Synthetic Rubber*

(1,000 Long Tons)

Year	U.S.A.	Canada	United Kingdom	Total Continent of Europe	World† Grand Total
1959	1,071.3	57.2	79.0	231.0	1,567.5
Jan.	89.6	4.4	5.8	15.8	122.5
Feb.	87.4	5.2	5.7	17.5	125.0
Mar.	95.1	5.0	7.0	17.5	132.5
Apr.	79.7	5.1	6.2	18.3	120.0
May	74.6	4.8	6.0	18.3	112.5
June	91.7	5.5	8.1	18.5	135.0
July	93.7	4.5	5.4	19.0	135.0
Aug.	91.0	3.4	4.3	15.5	127.5
Sept.	96.9	5.0	8.3	20.0	142.5
Oct.	98.6	4.8	6.6	20.8	145.0
Nov.	83.9	4.9	7.2	22.3	132.5
Dec.	89.1	4.7	8.7	21.7	137.5
1960					
Jan.	95.1	4.8	8.4	23.0	142.5
Feb.	93.2	5.2	8.5	24.8	145.0
Mar.	97.7	5.4	10.5	...	152.5
Apr.	90.2	...	8.4	...	...

*Includes latices.

†Figures estimated or partly estimated.

Source: Secretariat of the International Rubber Study Group; and Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

World Production of Synthetic Rubber

(1,000 Long Tons)

Year	U.S.A.	Canada	Germany	Total
1959	1,379.7	100.7	48.1	1,528.5
Jan.	108.5	13.0	2.0	123.5
Feb.	102.3	11.7	2.3	116.3
Mar.	111.4	7.5	3.7	122.6
Apr.	108.5	0.0	3.5	111.9
May	110.0	0.3	3.0	113.3
June	106.7	0.4	4.7	111.5
July	114.3	9.2	3.2	126.7
Aug.	119.0	11.1	4.7	134.8
Sept.	119.8	11.4	4.6	135.9
Oct.	128.5	11.5	5.1	145.1
Nov.	124.8	11.9	5.4	142.1
Dec.	125.8	13.0	5.9	144.7
1960				
Jan.	130.7	12.6	5.9	149.2
Feb.	126.3	13.0	5.8	160.0
Mar.	131.9	14.2	7.3	165.0
April	120.9	...	7.0	...

Source: Secretariat of the International Rubber Study Group; and Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U.S.A. Imports and Production of Natural (Including Latex and Guayule) and Synthetic Rubber (in Long Tons)

Year	Natural	SBR Types	Butyl	Neoprene	N-Type	Total Natural and Synthetic
1959	580,197	1,130,660	81,008	124,815	43,169	1,959,849
Jan.	54,950	90,261	4,992	9,991	3,260	163,454
Feb.	48,917	83,067	5,650	10,256	3,324	151,214
Mar.	48,584	91,847	6,056	9,690	3,784	159,961
Apr.	44,347	88,444	6,279	10,455	3,299	152,874
May	45,451	89,625	6,467	10,249	3,610	155,402
June	46,048	87,221	5,583	10,216	3,696	153,124
July	47,527	94,749	6,391	9,365	3,811	161,843
Aug.	45,359	97,113	8,050	10,471	3,397	164,930
Sept.	47,643	97,677	7,399	10,888	3,883	167,490
Oct.	48,378	106,643	7,957	10,099	3,833	176,910
Nov.	48,844	101,856	7,523	11,660	3,786	173,669
Dec.	54,149	102,157	8,661	11,475	3,486	179,928
1960						
Jan.	34,795	106,853	8,171	11,958	3,760	170,876
Feb.	40,949	104,603	6,514	12,106	3,111	173,095
Mar.	38,580	109,440	7,605	11,305	3,583	170,513
Apr.	36,343	97,963	7,958	11,879	3,095	157,238
May*	...	102,501	9,814	11,401	3,088	...

*Preliminary.

Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

U.S.A. Consumption of Natural and Synthetic Latices

(Long Tons, Dry Weight)

Year	Natural	SBR	Neoprene	N-Type	Total Synthetic	Total Natural & Synthetic
1959	71,745	80,646	11,394	13,258	105,298	177,043
Jan.	7,184	6,886	925	1,244	9,055	16,239
Feb.	6,489	7,083	859	1,009	8,951	15,440
Mar.	7,052	7,275	1,054	1,208	9,537	16,589
Apr.	5,793	5,629	1,104	1,169	7,902	13,695
May	5,429	5,962	995	1,112	8,069	14,966
June	5,622	6,497	910	1,150	8,557	14,179
July	5,004	5,804	919	940	7,663	12,667
Aug.	6,613	7,348	961	1,116	9,425	16,038
Sept.	6,342	6,919	910	1,178	9,007	15,349
Oct.	6,153	7,388	969	1,158	9,515	15,668
Nov.	4,858	6,427	893	981	8,301	13,159
Dec.	5,206	7,428	895	993	9,316	14,522
1960						
Jan.	5,493	8,094	999	1,117	10,210	15,701
Feb.	5,463	7,838	969	1,000	9,807	15,270
Mar.	4,847	8,104	1,076	927	10,107	14,954
Apr.	4,199	97,963	913	976	9,043	13,142
May*	3,655	102,501	868	978	8,667	11,322

*Preliminary.

Source: Bureau of the Census, Industry Division, Chemicals Branch, United States Department of Commerce.

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ALL STEEL, ALL WELDED CONSTRUCTION, with forged steel hubs for 1 1/4", 1 1/2" and 2" square bars. 4", 5", 6", 8", 10", 12", 15", 20" and 24" diameters. Any length. Also Special Trucks (Leaf Type) Racks, Tables and Jigs.

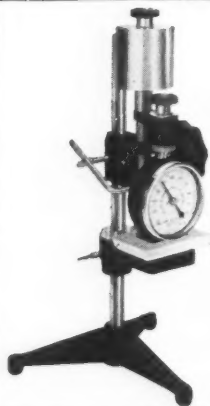
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UNVULCANIZED RUBBER OR PLASTIC
BEVEL OR STRAIGHT EDGE

CUT PRECISION SOLES UP TO 1" THICK

WELLMAN CO., MEDFORD, MASS., U. S. A.

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A young, 34, graduate Chemist with nine years' experience in latex compounding, laboratory supervision, and technical service to production. Desire position of responsibility in technical service to production or sales; willing to relocate and engage in limited amount of travel. Veteran; married. Box No. 2499, care of RUBBER WORLD.

CHEMIST-SUPERVISOR—DISPERSION, EMULSION & LATEX.
A young man with dispersion, emulsion, and latex formulating and manufacturing experience dating back to 1948. For the last eight years and at present in a supervisory position of heavy responsibility for the handling and conversion of material totaling four million dollars annually. 31, married; willing to relocate. Box No. 2500, care of RUBBER WORLD.

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FOR SALE: BAKER-PERKINS #15-UUMM DISPERSION BLADE double-arm mixer, 100-gallon, jacketed, 100-HP explosionproof motor, motorized tilt, cored blades, compression ram cover. Also 200-gallon B-P mixers. PERRY EQUIPMENT CORP., 1424 N. 6th St., Phila. 22, Pa.

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FOR SALE: GOOD USED GRINDING EQUIPMENT

(a) Szegevari Attritor M-100, (b) Tri Homo Dispenser #10-SS, (c) Patterson Ball Mill 6000# Capacity. Address Box No. 2490, care of RUBBER WORLD.

—FOR SALE—

- 4—Blaw Knox 6' x 40' Horizontal Vulcanizers with quick-opening doors, 250# working pressure, ASME.
- 2—Royle #1/4 Extruders, complete.
- 1—Peerless Guillotine Cutter, 30" blade, with motor.
- 1—Allen 4" Extruder with 25 HP motor.

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Rubber Mills, 30", 42", 50", and 60" sizes in stock. 600-Ton Adamson Slab Side 8-Opening Hydraulic Press, 42" x 42" Platen, 26" chrome-plated ram. Worthington Hydraulic Pump, duplex double-acting 200 GPM, 2500 PSI. Ideal for accumulator system. Vaughn 18" x 40" 4-Roll "L" Type Calender with motor and reduction drive. Allen 6" Rubber Tuber with strainer head. 24" x 24" Molding Presses with 12", 14", and 16" rams. A full line of equipment for the Rubber Industry: Banbury Mixers, Tubers, Rubber Mills, Molding Presses, Die Cutting Presses, Accumulators, Vulcanizers, etc., etc. Write for brochure on our new 6" x 13" Rubber Lab Mill. WE WILL FINANCE. JOHNSON MACHINERY COMPANY, 90 Elizabeth Avenue, Elizabeth, New Jersey. Elizabeth 5-2300.

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Includes—open roll storage for approx. 425-24" dia. rolls (Slightly less if 30" dia.)

15 ft. long and approx. 125 same dia. 12 ft. rolls

ADDITIONAL

Boxed or factory wrapped

for (40)—15 ft. rolls

2 electric winders

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FOR SALE: 1—FARREL-BIRMINGHAM SIZE "B" BANBURY Mixer; 1—Farrel-Birmingham 8" x 16" 2-Roll Mill chromeplated; 1—Baker-Perkins 9-gal. 304 S.S. sigma-blade Mixer; 1—Baker-Perkins 100-gal. Sigma-blade Mixer; 1—Baker-Perkins size #16TRM 150-gal. sigma-blade vacuum Mixer; 1—Baker-Perkins 100-gal. masticating blade Mixer 100 HP; 1—Ball & Jewel #1 Rotary Cutter; Powder Mixers; Tablet Presses; Screens. Your inquiries solicited. BRILL EQUIPMENT COMPANY, 35-49 Jabez Street, Newark, N. J.

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MILLS, CALENDERS, TUBERS
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UNITED RUBBER MACHINERY EXCHANGE

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By Order Of The Board Of Directors, Due to consolidation of facilities

VALUABLE REAL ESTATE

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RUBBER MAKING MACHINERY & EQUIPMENT

Of The

NEW YORK RUBBER COMPANY, BEACON, NEW YORK

SALE DATE: Tuesday, September 20th, 1960 • Starting at 10:30 A.M. (DST)

INSPECTION: Sept. 13th to Sale Date.

COMPRISING

12 RUBBER MIXING MILLS

2 lines of three 18"x50" Farrel Birmingham, each line coupled to 250 HP motor & reduction drive unit; 2 lines of two 22"x60" Farrel Birmingham, each line coupled to 125 HP reduction gear unit & motor; 1 line of two 20"x60" Vaughn, coupled to Helical speed reducer & 150 HP motor.

3 CALENDERS

54", 60" & 66" Farrel Birmingham 3-roll calenders, complete with gear reduction units & direct coupled motors.

CONVEYOR BELT PRESSES

4 Farrel Birmingham hydraulic, 2 platen steam presses, (1) 52"x26' with 12 hydraulic rams; (1) 61"x21' with 20 hydraulic rams; (1) 43"x25' with 6 hydraulic rams; (1) 65"x25½' with 24 hydraulic rams; Farrel & Southwark multiple platen hydraulic curing & vulcanizing presses; 5 platen steam press 66"x48"; 2 Farrel 2-steel roll belt press 38"x7" rolls; 1—60"x12" diameter rolls.

LABORATORY EQUIPMENT: Fully equipped laboratory.

TUBERS: #1 & #3 Royle direct motor drive.

CUTTERS & SLITTERS: 42" Black Rock hydraulic cutter, Eastman knife cutter; Farrel 64" knife slitting machine with 18 adjustable knives; miscellaneous belt cutting & inspection machines; Camachine 82" power slitter; Belt-master 56" portable cutting machine; NYR 2-steel roll belt cutting & inspection machines, 64" roll, 30' table.

COATING MACHINES: 4 Barry 1953 coating machines, 72" wide; 72" roll Doubler; Sterling dusting & blower unit; 9 American & Berry tank cement churns, 200 gal. capacity; (4) Day & Ross motor driven paint mixers.

MISC. RUBBER EQUIPMENT: Quantity of winding and rewinding units motor driven, Singer sewing machines, bench type vulcanizers, 72" Van Vlanderen beamer, Curtiss brush units, V belt roll die machine, endless belt curing unit, buffing machines, lead lined testing tank.

COMPRESSORS & PUMPS: 50 HP Gardner Denver compressor 6½"x5½"; Binks single stage, Worthington Y type 5 HP motor; centrifugal & monobloc pumps, (2) Worthington vertical hi pressure pumps 30 HP motors, 40 HP Gould water pumps, etc.

COMPLETE MACHINE SHOP: Lathes, millers, saws, shapers; woodworking equipment, i.e. saws, borers, etc.; complete Cafeteria; factory handling equip., i.e. 2-ton Clark hydra-tork car loader, Clark fork lift; Chevrolet, International Ford, Studebaker trucks; large assortment of chain & electric hoists up to 3-ton; overhead tramrail system.

OFFICE FURNITURE & EQUIP.: Tremendous asst. of office equipment including walnut executive desks, chairs, & tables; National bookkeeping machines, (13) I.B.M., Royal, Remington typewriters; (10) Marchant, Monroe electric calculators; mimeograph, addressograph; dictaphones, etc., and hundreds of other items.

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U.S.A. Rubber Industry Employment, Wages, Hours

Year	Production Workers (1000's)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Consumer's Price Index
1939	121.0	All Rubber Products \$27.84	39.9	\$0.75	
1959					
Jan.	199.1	100.28	41.1	2.44	123.8
Feb.	198.8	101.09	41.6	2.43	123.7
Mar.	201.5	103.74	42.0	2.47	123.9
Apr.	237.0	101.57	41.8	2.43	124.0
May	231.9	101.46	42.1	2.41	124.5
June	255.8	98.74	40.3	2.45	124.9
July	264.0	107.10	42.5	2.52	124.8
Aug.	264.7	105.33	42.3	2.49	125.2
Sept.	273.5	102.01	41.3	2.47	125.6
Oct.	273.2	101.18	40.8	2.48	125.5
Nov.	270.1	97.66	39.7	2.46	125.4
Dec.	269.5	101.59	40.8	2.49	126.5
1960					
Jan.	269.2	102.16	40.7	2.51	126.5
Feb.	269.0	100.00	40.0	2.50	126.7
Mar.	267.5	97.10	39.4	2.48	126.2
Apr.	263.5				
Tires and Tubes					
1939	54.2	\$33.36	35.0	\$0.96	
1959					
Jan.	76.9	117.55	41.1	2.86	
Feb.	76.2	118.98	41.6	2.86	
Mar.	77.9	122.96	42.4	2.90	
Apr.	93.1	123.98	42.9	2.89	
May	79.5	126.13	42.9	2.94	
June	97.0	108.93	36.8	2.96	
July	106.7	128.74	43.2	2.98	
Aug.	105.4	127.74	43.3	2.95	
Sept.	108.0	117.56	40.4	2.91	
Oct.	107.0	117.49	40.1	2.93	
Nov.	106.1	112.62	38.7	2.91	
Dec.	105.5	118.59	40.2	2.95	
1960					
Jan.	105.3	119.80	40.5	2.98	
Feb.	104.0	117.71	39.5	2.98	
Mar.	105.1	113.68	38.8	2.93	
Rubber Footwear					
1939	14.8	\$22.80	37.5	\$0.61	
1959					
Jan.	17.1	78.20	39.9	1.96	
Feb.	17.1	80.59	40.7	1.98	
Mar.	17.4	79.79	40.3	1.98	
Apr.	17.2	73.05	39.7	1.84	
May	21.8	79.58	40.6	1.96	
June	22.3	81.58	41.2	1.98	
July	22.5	78.60	40.1	1.96	
Aug.	22.7	79.17	40.6	1.95	
Sept.	23.2	79.18	40.4	1.96	
Oct.	23.3	79.40	39.9	1.99	
Nov.	23.7	79.80	39.9	2.00	
Dec.	23.6	80.79	39.8	2.03	
1960					
Jan.	23.1	79.40	39.5	2.01	
Feb.	23.0	77.21	38.8	1.99	
Mar.	22.0	77.62	39.2	1.98	
Other Rubber Products					
1939	51.9	\$23.34	38.9	\$0.61	
1959					
Jan.	105.1	91.27	41.3	2.21	
Feb.	105.5	91.96	41.8	2.20	
Mar.	106.2	93.02	41.9	2.22	
Apr.	126.7	90.03	41.3	2.18	
May	130.6	92.18	41.9	2.20	
June	136.5	94.98	42.4	2.24	
July	134.8	95.40	42.4	2.25	
Aug.	136.6	93.21	41.8	2.23	
Sept.	142.3	94.73	42.1	2.25	
Oct.	142.9	93.38	41.5	2.25	
Nov.	140.3	89.87	40.3	2.23	
Dec.	140.4	92.93	41.3	2.25	
1960					
Jan.	140.8	93.52	41.2	2.27	
Feb.	142.0	91.76	40.6	2.26	
Mar.	139.6	89.15	39.8	2.24	

Source: BLS, United States Department of Labor.

U.S.A. Automotive Pneumatic Casings

(Thousands of Units)						
Year	Shipments				Production	Inventory End of Period
	Original Equip- ment	Re- place- ment	Export	Total		
Passenger Car						
1959						
Apr. . .	3,115	6,390	64.8	9,569	6,986	17,597
May . .	2,848	5,617	38.4	8,504	6,953	15,721
June . .	2,904	5,936	46.3	8,886	9,022	16,134
July . .	3,188	5,988	65.4	9,242	9,857	16,853
Aug. . .	973	5,721	67.3	6,761	8,458	18,677
Sept. . .	1,923	5,850	77.4	7,850	8,804	19,636
Oct. . .	2,628	6,015	78.9	8,722	9,374	20,287
Nov. . .	1,252	4,161	63.5	5,476	7,088	21,996
Dec. . .	2,916	3,829	105.8	6,849	8,349	23,599
1960						
Jan. . .	3,912	6,006	111	10,030	9,011	22,567
Feb. . .	3,569	5,257	78	8,804	9,371	22,972
Mar. . .	3,333	5,156	90	8,578	9,679	24,144
Apr. . .	3,200	6,558	114	9,872	9,165	23,512
May . .	3,361	6,542	78	9,981	9,548	22,985
Truck and Bus						
1959						
Apr. . .	479	907	44	1,430	1,039	3,276
May . .	442	738	41	1,222	943	3,006
June . .	488	820	44	1,352	1,272	2,954
July . .	400	844	47	1,290	1,366	3,023
Aug. . .	276	874	46	1,196	1,225	3,054
Sept. . .	422	969	58	1,448	1,299	2,906
Oct. . .	338	1,151	57	1,546	1,510	2,864
Nov. . .	189	737	56	981	1,259	3,137
Dec. . .	285	739	75	1,099	1,301	3,355
1960						
Jan. . .	421	826	45	1,292	1,315	3,376
Feb. . .	428	789	59	1,275	1,401	3,502
Mar. . .	421	671	67	1,158	1,436	3,777
Apr. . .	385	790	68	1,207	1,321	3,982
May . .	363	764	80	1,207	1,321	3,982
Total Automotive						
1959						
Apr. . .	3,594	7,297	108	10,999	8,025	20,872
May . .	3,291	6,356	79	9,726	7,796	18,727
June . .	3,392	6,756	90	10,237	10,294	19,098
July . .	3,588	6,832	112	10,532	11,223	19,877
Aug. . .	1,249	6,595	114	7,957	9,683	21,730
Sept. . .	2,345	6,819	135	9,298	10,103	22,542
Oct. . .	2,966	7,166	136	10,269	10,884	23,151
Nov. . .	1,440	4,898	120	6,458	8,347	25,133
Dec. . .	3,200	4,567	181	7,948	9,649	26,955
1960						
Jan. . .	4,333	6,833	156	11,322	10,325	25,943
Feb. . .	3,996	6,047	136	10,179	10,772	26,473
Mar. . .	3,753	5,827	157	9,737	11,115	27,921
Apr. . .	3,584	7,347	182	11,114	10,517	27,401
May . .	3,724	7,306	157	11,188	10,779	26,967

Source: The Rubber Manufacturers Association, Inc.

U.S.A. Automotive Inner Tubes

(Thousands of Units)						
Year	Shipments				Production	Inventory End of Period
	Original Equipment	Replacement	Export	Total		
1959						
Feb.	311	3,924	81	4,316	4,094	7,364
Mar.	339	4,013	83	4,435	4,459	7,629
Apr.	389	3,473	65	3,928	3,380	7,218
May	363	2,853	59	3,275	2,752	6,849
June	392	3,421	59	3,872	3,683	6,999
July	317	3,564	66	3,948	4,345	7,560
Aug.	210	3,297	77	3,583	3,716	7,848
Sept.	347	3,258	88	3,693	4,065	8,334
Oct.	265	3,571	79	3,915	4,392	9,088
Nov.	163	2,867	67	3,097	3,756	9,918
Dec.	240	2,793	102	3,135	3,612	10,536
1960						
Jan.	365	4,964	62	5,391	3,899	8,924
Feb.	370	3,553	87	4,011	4,043	9,002
Mar.	365	2,807	111	3,282	4,241	10,113
Apr.	330	2,862	114	3,306	3,628	10,495
May	307	2,932	91	3,330	3,611	10,852

Source: The Rubber Manufacturers Association, Inc.

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1—24" x 24" Erie press, 18" ram; 1—6" x 12"—3-roll Adamson vertical calender; 2—125-gallon Day gearless pony mixers, 10 HP; 1—6" x 16" Thropp 2-roll mill. CHEMICAL & PROCESS MACHINERY CORP., 52 9th Street, Brooklyn 15, New York, NY 9-7200.

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Carbon Black Statistics—Jan.-May, 1960

Furnace blacks are classified as follows: SRF, semi-reinforcing furnace black; HMF, high modulus furnace black; GPF, general-purpose furnace black; FEF, fast-extruding furnace black; HAF, high abrasion furnace black; SAF, super abrasion furnace black; ISAF, intermediate super abrasion furnace black.

(Thousands of Pounds)

Production					
Furnace types	Jan.	Feb.	Mar.	Apr.	May
Thermal	14,746	12,438	14,690	13,481	13,337
SRF	27,138	25,673	28,063	30,176	30,380
HMF	6,645	5,919	5,777	6,883	7,361
GPF	9,462	9,722	9,833	10,420	10,711
FEF	21,450	22,599	23,423	20,449	22,938
HAF	49,793	43,816	44,466	43,049	52,592
SAF	—	1,549	1,778	2,837	357
ISAF	24,744	25,283	30,116	29,720	26,299
Total furnace	153,978	146,999	158,146	157,015	163,975
Contact types	25,590	23,503	25,099	25,155	25,105
Totals	179,568	170,502	183,245	182,170	189,080
Shipments					
Furnace types	Jan.	Feb.	Mar.	Apr.	May
Thermal	19,372	9,159	14,100	12,130	12,531
SRF	25,327	25,680	29,378	28,175	25,877
HMF	5,533	6,780	6,759	6,977	5,727
GPF	8,194	9,034	9,556	11,547	11,056
FEF	20,845	20,824	22,421	19,258	17,416
HAF	45,492	42,592	44,037	45,443	39,810
SAF	826	993	1,483	1,559	1,861
ISAF	23,034	27,284	28,253	26,101	26,026
Total furnace	148,623	142,346	155,987	151,190	140,304
Contact types	40,807	15,474	23,666	26,247	22,493
Totals	189,430	157,820	179,653	177,837	162,797
Producers' Stocks, End of Period					
Furnace types	Jan.	Feb.	Mar.	Apr.	May
Thermal	16,097	19,376	19,966	21,317	22,123
SRF	24,506	24,543	23,228	25,229	29,732
HMF	4,894	4,033	3,051	2,957	4,591
GPF	6,253	6,941	7,218	6,091	5,746
FEF	10,957	12,732	13,734	14,925	20,447
HAF	35,630	36,854	37,283	35,092	47,874
SAF	3,254	3,810	4,105	5,383	3,879
ISAF	30,364	28,363	30,226	33,845	34,118
Total furnace	131,955	136,652	138,811	144,839	168,510
Contact types	52,025	60,054	61,487	59,995	62,607
Totals	183,980	196,706	200,298	204,834	231,117
Exports					
Furnace types	Jan.	Feb.	Mar.	Apr.	May
Total furnace	37,598	26,574	35,408	41,367	.....
Contact types	23,310	10,635	8,920	13,862	.....
Totals	60,908	37,209	44,328	55,229	.....

Source: Bureau of Mines, United States Department of the Interior, Washington, D. C.

U.S.A. Rubber Industry Economic Indicators

Year	Production Index*				% Return †	
	Rubber and Seasonally Adjusted, %		Plastics Products Without Seasonal Adjustment, %		On Sales	On Investment
	1947-49	1957	1947-49	1957	R&MP‡	R&MP
1959	100	100	100	100		
Jan.	199	114	199	114	4.0	8.6
Feb.	189	108	198	113		
Mar.	197	113	208	119		
Apr.	196	112	206	118	3.9	8.0
May	182	104	187	107		
June	183	105	179	103		
July	205	117	199	114	4.4	10.4
Aug.	223	128	187	107		
Sept.	210	120	203	117		
Oct.	209	120	212	121	4.1	8.8
Nov.	201	115	211	121		
Dec.	198	113	203	116		
1960	203	116	194	111	3.7	8.0
Jan.	206	118	216	122		
Feb.	201	115	212	124		
Mar.	...	...	205	...	3.8	8.0

* F.R.B. Index of Industrial Production revised to include plastics products and change base period.

† Base Data F.I.C.-S.E.C.-Quarterly Financial Reports—%. Calculated by RMA.

‡ R&MP = Rubber and Miscellaneous Plastics, a classification revised according to the 1959 Standard Industrial Classifications.

U.S.A. Production of Cotton, Rayon, and Nylon Tire Fabrics

(Thousands of Pounds)

Year	Cotton and Nylon*		Rayon Tire Cord and Tire Cord Fabric	Total All Tire Cord and Fabrics
	Cotton Chafer Fabrics and Other Tire Fabrics	Cotton and Nylon Tire Cord and Fabrics		
1958				
Jan.-Mar.	9,750	18,820	66,830	167,924
Apr.-June	7,890	24,725	49,454	80,533
July-Sept.	7,999	24,904	†	91,984
Oct.-Dec.	10,533	26,392	71,827	107,532
1959				
Jan.-Mar.	9,163	32,402	77,307	122,290
Apr.-June	7,699	29,403	76,265	116,965
July-Sept.	8,318	31,545	76,671	119,748
Oct.-Dec.	7,279	34,179	66,756	111,332
1960				
Jan.-Mar.	8,055	37,638	68,699	116,595

* Cotton and nylon figures combined to avoid disclosing data for individual companies.

† Not available.

Source: Bureau of the Census, United States Department of Commerce.

U.S.A. Rubber Industry Sales and Inventories

(Millions of Dollars)

	Value of Sales*				Manufacturers' Inventories*			
	1957	1958	1959	1960	1957	1958	1959	1960
Jan.	496	448	508	530	1,047	1,100	1,013	1,148
Feb.	495	413	490	540	1,036	1,087	1,032	1,140
Mar.	476	412	506	510	1,030	1,112	1,030	1,160
Apr.	490	429	543	530	1,031	1,047	1,015	1,190
May	481	428	524	550	1,024	1,020	995	1,160
June	458	445	520	...	1,027	986	1,013	...
July	514	478	519	...	1,045	980	1,075	...
Aug.	481	438	492	...	1,074	1,024	1,113	...
Sept.	481	464	544	...	1,074	1,024	1,114	...
Oct.	490	493	555	...	1,097	1,022	1,115	...
Nov.	431	472	482	...	1,101	1,018	1,120	...
Dec.	427	518	508	...	1,092	994	1,124	...
Total	5,720	5,438	6,191	...	12,678	12,414	12,759	...

* Adjusted for seasonal variation.

Source: Office of Business Economics, United States Department of Commerce.

U.S.A. Rubber Use by Products

(1,000 Long Tons)

Year	Transportation			Non-Transportation			Grand Total
	Natural	Synthetic	Total	Natural	Synthetic	Total	
1955	409.6	550.3	959.9	225.2	344.7	569.8	1,529.7
1956	364.0	533.0	897.0	198.1	341.3	539.5	1,436.5
1957	342.7	583.5	926.2	196.0	342.4	538.5	1,464.6
1958	302.0	558.9	860.9	182.4	321.0	503.5	1,364.4
1959	354.7	669.6	1,024.3	200.4	401.7	602.1	1,627.7
1959							
1st qt.	95.1	172.3	267.4	54.1	99.8	153.9	421.7
2nd qt.	78.9	148.5	226.3	49.1	98.6	147.8	374.4
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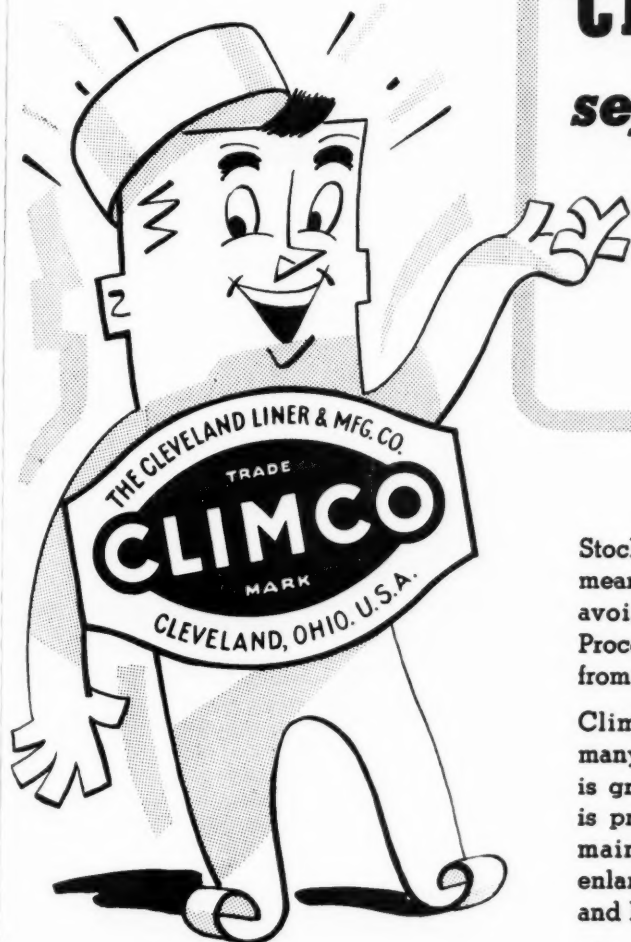
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